



*Consiglio Nazionale delle Ricerche*

Istituto di Scienza e Tecnologie dell'Informazione "A. Faedo" (ISTI)

# **Research Ambient Assisted Living solutions in the European Context**

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## **Abstract**

This report aims to take stock of the work carried out in European projects that are related to the senior citizens.

We have not considered older programmes even if concerning with problems of disabled and elderly people like TIDE Programme (**T**echnology **I**nitiative for **D**isabled and **E**lderly People) the COST 219 RACE and ACTS programmes, but we have considered only the newest projects.

In this publication have been reviewed the projects of the AAL program with special attention of the amount invested in each technology and topic. In fact, from the summary of each project, we have derived the main technology used (see column entitled "Technology" in the summary tables) and the problems that the project aimed to solve (see column entitled "topic" in the summary tables). We then ranked the projects according to these categories and we calculated various statistics.

For each call of the program have been reported synthetic abstract, a summary table and some statistics and final thoughts.

Later other projects of the 6<sup>th</sup> and 7<sup>th</sup> Framework Programme which seemed inherent issues of interest to the subject matter of this report were taken into account.

After a deep analysis, evaluation and re-elaboration of the mentioned projects, this work aims to be a consultation document to quickly have an overview of the state of the art.

## Introduction

The number of people in need of care grows constantly because of the increasing of average age and quantity of people with physical limitations, especially in Europe. The manpower shortage in the care sector, which is more and more in financial straits, make seniors depend on their close relatives for the care needs.

The prime aim of technology should be to improve the quality of life and, in particular, are also included disabled and elderly, whose physical and sensory disabilities can be partially compensated for with technological products. Modern society should therefore use its resources to promote the social integration of disabled people by enabling them to be autonomous and by helping them to gain access to education and working environments. Modern technology is continuously enhancing our standard of life. This has been made possible particularly by research in areas as "Intelligent Building", telematics, computer-vision, robotics, artificial intelligence, etc. where the increase of power of computation systems are yet less and less expensive. This permits to computation systems to simulate what were previously considered as being exclusively human roles - learning, reasoning and communication.

For several decades in Europe-27, the number of elderly is growing continuously. In the last two decades, the population has grown by 0.3% while the population of elderly grew by 3.7%<sup>2</sup>. The median age increased from 35.3 to 40.9 years from 1990 to 2010. It is estimated that in 2020 the population over 65 years will be more than 25% of the whole European population. In the near future the number of people will fall while the proportion of older people will increase and it is expected that the relationship between the people who work with the rest of the population will increase from the current 2 to 1 reaching 4 to 1. Baseline projections of old age dependency ratios in EU Member States (65+ over people aged 20-64 years) says that the percentage will overcome 50% in 2035. This is the main effect of population ageing and the retirement of the "baby boomer"<sup>3</sup> generation has highlighted this truth.

In Europe ISTAT (Italian national Institute of statistic) the population over 65 years old was 20,5%, more than 1 point of the same percentage of 2005, in 2020 will be 23,2%, in 2030 27% and in 2050 will be 33,6%

Because of the low fertility and increased longevity in Italy, the ratio between the number of older people and the total population is much higher than other European countries. Immigration has contributed to lower the ratio, which remains among the highest in Europe.

This is demonstrated by the data collected by ISTAT in a report of the year 2007, where a total of 59.1 million inhabitants, the elderly over 65 were found to be 11.8 million, reaching a market share of 19.9% of the total population and this percentage can reach 26.5% by 2030. From 1980 to 2005 the number of over sixty increased by 50%, while that of octogenarians by more than 150%. It can therefore detect a trend in continuous and substantial growth.

Also going to look at the figure for the average life expectancy in the country, we can highlight that this is increased from 71 years for men and 77 years for women registered at the beginning of the eighties; to 77 years for men and 83 years for women currently encountered. Regarding the gender of the population, it is possible to notice how women are

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<sup>2</sup> Source "AMBIENT ASSISTED LIVING JOINT PROGRAMME - ICT for ageing well (<http://www.aal-europe.eu/about/demographic-change/>)

<sup>3</sup> Person who was born between 1946 and 1964. This definition is applied to people born in north America, but can be used also for people born in this period of the whole world.

predominantly to be disadvantaged. This disadvantage increases with increasing age: almost half (49%) of women aged 80 years and older may have a disability, while similar percentage for men is 36%. Also noteworthy is that, in relation to the increase of the population, the ISTAT estimates that the number of disabled people for the next 20 years will increase of 65-75%.

During the period of 2004-2005, in Italy, people with disabilities over six years old living in the household were about 2.6 million (4.8% of the population aged 6 and over who lives in the family), over 2 million had more than 65 years, and of these more than half (about 1,200,000) had more than 80 years.

These considerations suggest to focus research efforts for supporting the elderly allowing suitable conditions to no longer active people. With new technologies will be possible to increase the autonomy of the elderly so that they can live longer in their preferred environment without decreasing safety and care they need. These possibilities offered by technology will create more pleasant conditions for the elderly and may also be a cost saving.

A further consideration must be made on the habits of today elderly people. Until a not long ago the elderly were reluctant to exploit the technology. Most of them did not know how to use a computer and some of them even refused to use the mobile phone. Today's seniors are much more accustomed to using computers that often they had to use them for work. The introduction of tablet and computers also for recreation, it is very widespread in recent years and the percentage of seniors who appreciate the technology has greatly increased. This percentage is likely to grow in the coming years and communication technology will surely be well accepted even by the elderly.

The European Commission has funded many research projects finalized to use innovative technologies, new philosophies and new rules in order to assist elderly people to live independently in their home environment as long as possible. Many programs with these goals have been organized like the old "Tide program" of nineties (Technology initiative for disabled and elderly people) of European Commission, Directorate-General for Communications Networks, Content and Technology arriving to current AAL (Ambient Assisted living).

The research in this area has demonstrated the usefulness and showed that a large number of users can enjoy the solutions that have been developed by various projects and those promoted and financed by the European Commission (AAL program) as well as those who have done more modestly from industry associations who have not always benefited from external funding.

Below are taken into account the programs and relevant projects of the European Union about issues related to the elderly and disabled.

## 1. European context

This report, in first stage, examines the main European research projects related to disabled and elderly and, to a later stage, it focuses the attention to their socialization.

Even if we cannot ignore old programmes of the European commission like:

- TIDE Programme (Technology initiative for disabled and elderly people): that has promoted research and technological development to meet social and industrial goals,

stimulating a single market in Assistive Technology in Europe, to facilitate the socio-economic integration of disabled and elderly people;

- the COST 219: that has promoted activities that deal with problems related to the integration of disabled and elderly people;
- other European Commission technological initiatives: where specific research and development project work has addressed the requirements of people with disabilities, like the RACE and ACTS programmes.

In this work only recent activities and later-day projects like those of AAL Programme (Ambient Assisted Living Joint Programme) and FP7 (Framework Programme 7) are considered.

## **1.1 Assisted Living Joint Programme - ICT for ageing well (AAL)**

Ambient Assisted Living (AAL) aims to extend the time people can live independently in their home environment by increasing their autonomy and self-confidence, the discharge of monotonously everyday activities, to monitor and care for the elderly or ill person, to enhance the security and to save resources.

Ambient Assisted Living (AAL) is a European Initiative based on the Article 169 of the European Treaty that was born in order to address the needs of the ageing population, to reduce innovation barriers of forthcoming promising markets and also to lower future social security costs. This initiative is planned to be implemented during the 7th EU Framework Programme.

The overall goals of AAL would be the following:

- improve the quality of life of elderly people at their homes as it is known that they prefer to live at their own home instead of living at an hospice;
- reduce the costs associated with elderly care.
- AAL addresses in particular the issues affecting an ageing population and targets the needs of the individual person and their caretakers, but two groups of persons are considered:
  - elderly people who can be disabled or actively aged. Actively aged are those elderly people whose limitations because of age are not perceived as a disability;
  - disabled people.

AAL is a European initiative but Europe is not the only one facing the problem of an aging society because the problem is a worldwide one. The philosophy behind AAL, this is, assisting elderly people to live independently in their own home environment as long as possible, is extended worldwide. In the following paragraphs we will describe projects and initiatives that have been developed or are being developed not only in Europe but in the rest of the world too.

AAL is not a technology but a philosophy. Typically, several technologies will be needed to develop AAL solutions. Those technologies include products and services that enable persons to perform tasks or functions at a level similar to an earlier experience, and/or contribute to a lifestyle of independence. Some of these AAL-related technologies would be the following:

- software and network technologies
- sensors and actuators
- human machine interfaces
- new materials



- embedded systems
- several technologies involved in smart homes
- other ambient intelligence technologies

In the following chapters all projects of this programme is examined and general information of each project is reported.

More details can be retrieve online searching the URL:

**[www.aal-europe.eu/projects/\[name of the project\]/](http://www.aal-europe.eu/projects/[name of the project]/)**

where *[name of the project]* must be substituted by the name of the project we are interested in.

## **1.2 Assistive technologies**

Assistive technologies are those products and services that enable persons (regardless of age) to perform a function that due to some disability would otherwise be difficult to perform.

While some disabilities are associated with aging, aging itself is not a disability and even if some limitations exist many elderly people do not perceive themselves as being disabled. On the one hand this means that assistive technologies would be a part of AAL technologies.

On the other hand, healthcare technologies are not AAL technologies but are closely related to them because aging population is the most concerned with healthcare.

AAL technologies cover a wider range of aging-related concerns. They represent a new category of technology with the following functionalities:

- enable elderly and disabled people to live in their own environment;
- assist aging people to function in society, facilitating social contacts, in addition to context-based infotainment and entertainment;
- provide communication services to aging persons so that they can communicate with family, caregivers and medical resources;
- telehealth, this means allowing a medical source to remotely monitor, diagnose and treat a patient.

Each functionality describes functions that may apply less to persons of a certain age than to “quality of life” and independence regardless of age.

## **1.3 Independent Living**

The concept of Independent Living (IL) challenges the preconceived medial models of disability and old age, by emphasizing self-determination and equal opportunities and the removal of societal barriers to participation. The medical view casts frail older and disabled people as defective and deviant, a burden for society and as passive recipients of professional interventions. IL emphasizes active social participation and the organization of societal supports within a radical agenda. Recent disability rights legislation and the recasting of health and social care policy has begun to move in this direction, but older and disabled people still find themselves marginalized within society. A review of the IL concept is provided in the paper by Sarah Gillinson, Hannah Green and Paul Miller (2005). (Gillinson, Sarah; Green, Hannah; Green, Paul; Miller (2005) Independent Living: The right to be equal citizens; [www.demos.co.uk](http://www.demos.co.uk)

## 2. Overview of European AAL projects

Below, the 5 AAL Programme calls for proposal are reported:

AAL CALL	Start	End	First started project	Last ended project
AAL Call 1	2/2009	11/2009	H@H (36 months)	Softcare (36 months)
AAL Call 2	2/2010	12/2011	SoMedAll (24 months)	M3W (24 months)
AAL Call 3	3/2011	9/2012	WayFis (30 months)	FOOD (36 months)
AAL Call 4	2/2012	4/2013	e-Stockings (36 months)	ALMA (36 months)
AAL Call 5	3/2013	9/2013	Care4Balance (30 months)	YouDo (36 months)

*Table 2-1: Durations of each AAL call*

In the following sections for each call is reported a list of projects related to elderly and disabled, provided with short summaries. The list is followed by a synoptic table where is summarized for each project :

**The name** and the title of the project

**Starting date and the duration**

**Budget**

**Disabled/Elderly** - A column that specify if the project is dedicated to Elderly or to a specific disability (even if the disability is often characteristic of elderly)

**Topic** – a keyword that specify the main object

**Target** – a more specific keyword of the topic

**Technology** - A keyword that specify the main technology used

**M€** - is the rounded budget.

The synoptic tables introduce new personalised columns in order to characterize the projects:

- “Disabled/Elderly”: In this column there are only two values:
  - E – **This value means that the project deals with problems typical of elderly people including diseases or disabilities that are typical of the elderly, but not the disability that might be present in every age**
  - D – **we have assigned this value to the projects that are typically dedicated to finding solutions for diseases or disabilities that are present not only in elderly population although between this persons the problem is more frequent.**

This columns enable us to create two different groups distinguishing the projects that study problems of elderly and project that study problems that can occur also to young people.

- “Topic”: summarize the general topic developed without too many details. This classification is very general but is important to compute some statistics. A more detailed column is the column “Target” where the topic is more specific. This column contains:
  - Daily help
  - Safety
  - Safe mobility
  - Health
  - Interoperability between platforms and languages

- Measure mental (and motor) abilities
  - Socialize
  - Socialize & virtual exercising
  - Specific diseases
  - Wellbeing
- “Target”: is intended to give a more specific information on the topic and although we have produced a graphical view of this column, the statistic is not very significant.
  - ”Technology“: describes the prevailing technology of the various projects by grouping them into a few categories. The categories of the selected technologies include:
    - Artificial Intelligence - are included in this category are projects that involve the development or use of AI to achieve their goals
    - Robot - are included in this category are projects that involve the development of a robot to achieve the objectives of the project
    - Sensor networks
    - Health sensors
    - Smart environments
    - Special devices
    - Augmented reality
    - Web-based social networks

More detailed information of each project can be retried using the url  
 “[http://www.aal-europe.eu/projects/\[name\\_of\\_the\\_project\]/](http://www.aal-europe.eu/projects/[name_of_the_project]/)”

## **2.1 AAL projects call 1**

### **2.1.1 Short abstracts**

#### **A2E2**

##### **Adaptive Ambient Empowerment for the Elderly**

Budget: € 3.074.485,72      Starting Date: May 1, 2009      Duration: 48 Months

End-users are involved in several phases of the project, including focus groups, pilots and an effectiveness study. Three groups of end user are used: elderly clients, care professionals and care researchers. User requirements are based on info from these groups and based on state of the art scientific literature. Based on this info a behavioural and motivational enrichment program is designed. Personal virtual coaches are created who help them to find the right balance between activity and rest throughout each day. A sensor platform is built and integrated to the virtual coach system platform. The coach is connected to several bio-sensors including activity sensors, blood pressure and weight sensors for interaction and adaptive feedback. This daily organizational structure is designed by a care program manager and researchers through a simple interface to create and arrange events for the client. Using this interface, the program manager can set the speech, language, and emotional character of the

virtual coaches.

## **AGNES**

### **User-sensitive Home-based Systems for Successful Ageing in a Networked Society**

Budget: € 3.074.485,72      Starting Date: September 1, 2009      Duration: 36 Months

AGNES will start by providing a basic ICT platform to create and maintain an easy-to-use web-based social network for individual elderly persons. This platform will be used to stimulate the elderly person. Timely information will be passed to the network on the activities and subjective state of the elderly person (e.g. presence, state of wellness, etc) allowing for a much better-tailored and timely response, attention and care so as to improve and maintain the well-being and independence of the elderly living in their own homes and reduce healthcare costs. The project will address chronic conditions such as mild cognitive impairment, and develop and test solutions to alleviate and/or prevent them. Informal carers, friends and family members will have greater access to information about the person, and those at a distance will be enabled to keep in touch and share activities with their elderly family member or friend, and to know their current condition.

## **ALADDIN**

### **A technology pLatform for the Assisted living of Dementia eLderly INdividuals and their carers**

Budget: € 1970322,97      Starting Date: September 1, 2009      Duration: 36 Months

The Carer's Client Application is used at home by carers and patients to access the services of the ALADDIN platform securely. Carers fill in the ALADDIN questionnaire for neuropsychological assessment from home, allowing for the patients' cognitive, behavioural and functional assessment. Physiological parameters (body weight and blood pressure) are recorded and submitted by the carer using the application. The Server Application is the core of the platform. It implements the basic functionalities of the platform, provides secure communication with client applications, stores the information about patients and carers, provides the possibility to exchange information with external Hospital Information Systems (HIS).

The third part of the platform is External Services provided by external web portals. There are two types of services involved: cognitive games and a social network.

## **AMICA**

### **Autonomy Motivation & Individual Self-Management for COPD patients**

Budget: € 2.941.362      Starting Date: April 1, 2009      Duration: 36 Months

A simple idea behind COPD exacerbations detection complexities. Generally speaking, AMICA tries to emulate the medical consultation at home: auscultation and interview. To achieve this, a series of physiological signals are obtained daily by means of an ad-hoc sensor. This information is then extended by that provided by the patient interacting with a Dedicated Mobile Device. By combining information coming from sensors and provided for the patient, the system is able to set off medical alarms, modify small aspects of the patients' treatment program or lifestyle, or even suggest hospitalization.

## **BEDMOND**

### **Behaviour pattern based assistant for the early detection and management of**

## **neurodegenerative diseases**

Budget: € 2.379.179 Starting Date: June 1, 2009 Duration: 36 Months

There is considerable interest in the ability to diagnose dementia of the Alzheimer type in the earliest possible stage of the disease.

It is known that people with Mild Cognitive Impairment (MCI) have a higher risk of developing Alzheimer. Its first indicators are subtly manifested in patients' daily behaviour patterns. Thus, an interest emerged for developing a technological system that can record and code behavioural changes occurring in the daily life of elderly persons applying low level sensors in the home. And this is, indeed, BEDMOND scope: an ICT-based system for the early detection of Alzheimer's disease (AD) and other neurodegenerative diseases on the basis of data assessment with health professional criteria. It addresses a system that supports the decision making process for the doctor for an early diagnosis, automating the information process related, first, to the recognition and modelling of the daily activity performed by the elder while being at home and, then, to the interpretation of deviations and behavioural changes detected. Technology in use is based on standards and open source, and interoperability, modularity and scalability criteria. User involvement is tackled under a user-centric interactive process for design and development, ending with field trials for real testing in real environment.

## **CAPMOUSE**

Budget: € 1.131.110 Starting Date: June 15, 2009 Duration: 36 Months

In the CapMouse project the essential Research & Development focus on the capacitive sensors and the interface for Octopus, i.e. the mobile, smart device. The CapMouse/Octopus will connect with a cable and USB.

A Headset shall be prepared, by Lots Design, for only one sensor arm with 5 sensors and the sensors connect via PC to UART to I2C to sensor to sensor plate - a series of highly innovative technical development steps that is executed by Brusell Dental, HMC International in cooperation. The end users have been involved from the beginning of the CapMouse project. The iterative testing continues and will be finished during 2011, conducted by Lots Design and PRO. At the mid-term review, in December 2010, a 6 Months extension of the project was granted.

## **CARE**

### **Safe Private Homes for Elderly Persons**

Budget: € 2.380.000 Starting Date: July 1, 2009 Duration: 30 Months

This CARE initiative is an end-user driven R&D activity where end-users represent major market players in AAL activities as they are either elderly persons or they have direct relation and responsibility towards elderly persons ensuring their safety and independent living. The R&D consortium is well balanced where one third is research institutes (AIT, BME EMT), one third is SMEs (Everon, SensoCube) and one third is end- users (Senioren Wohnpark Weser in Germany and Yrjö & Hanna in Finland). Selected elderly homes of the partner end-users are used for the evaluation and demonstration of the CARE concept. In the early phase of the project, it was necessary to perform interviews of end-users: more than 200 end-users (primary, secondary and tertiary) in Austria, Finland, Germany and Hungary were questioned. The interviewed end-users agreed that there is a definitive need for a fall detector at elderly homes and that the actual fall detectors (e.g. wearable systems) are not satisfactory. Architecture of the biologically-inspired stereo vision sensor was designed and the sensor and

algorithms for the detection of falls were developed. The CARE system is actually under testing and evaluation with first installations in Germany.

## **CCE**

### **Connected Care for Elderly Persons Suffering from Dementia**

Budget: € 3.000.000 Starting Date: July 1, 2009 Duration: 36 Months

The CCE dementia solutions comprises of connectivity between the different physical components, sensors, medication dispenser, server, Net TV, etc.

The system consists in general of following hardware and software components:

- Philips Net TV that provides a user interface for a digital corkboard
- A digital corkboard application
- A set of sensors that monitor the behaviour and the activities of the assisted person
- A medication dispenser
- A dementia diary that documents daily activities for the assisted person
- A middleware platform that integrates all of the data Pilots and demonstrations are currently underway in UK, Germany and Hungary to evaluate the MeMO-Net solution.

## **DOMEO**

### **Domestic Robot for Domestic Assistance**

Budget: € 2.400.000 Starting Date: July 1, 2009 Duration: 36 Months

DOMEO aims at helping elderly to stay longer and safer at home. By using advanced robotic technologies, DOMEO will also help caregivers in their daily work. The DOMEO platform includes:

- 2 types of robots (cognitive and physical);
- Graphic and tactile interfaces;
- Voice recognition and speech synthesis;
- Cloud services for tele-presence;
- Tools for integration of various sensors and services.

The middleware software platform used for integration, is available in open- source, to make easier different implementations and scenarios. DOMEO deals with all the aspects of assistive robotics:

- Robotic and internet technologies;
- Medical and non-medical sensors;
- Interface with home infrastructures;
- Ethical issues.

To demonstrate and validate the potential of open robotic platforms, intensive trials (lab trials, site demos, patients' homes field tests) are scheduled during the 3rd year.

## **eCAALYX**

### **Enhanced Complete Ambient Assisted Living Experiment**

Budget: € 4.118.002 Starting Date: May 1, 2009 Duration: 36 Months

eCAALYX's objectives can be summarised as follows:

Health monitoring of older and elderly persons with multiple chronic conditions, at home and on the move (the original CAALYX did not cover the health monitoring and management of older people with co morbidity).

- Improve the quality of life of elderly persons by increasing their freedom and safety. This is achieved by promptly detecting and controlling any decompensation episodes, so that their independent life at home can be extended and their hospitalisation or admission in nursing homes are avoided for longer periods. Besides improving the elderly person's quality of life, this approach will also result in various cost reductions and in relieving some of the growing burden on acute care/healthcare systems.
- Prevent deterioration of the patient condition by providing continuous support, guidance, and relevant health education (the original CAALYX did not have such strong home-based components for the delivery of education on leading a healthy lifestyle).

## **EMOTIONAAL**

### **The Emotional Village: Integrated Preventive AAL concept for the rural Aging Society in Europa**

Budget: € 3.200.000 Starting Date: July 1, 2009 Duration: 36 Months

The aim of EMOTIONAAL is to develop an integrated healthcare-concept for elderly people in rural areas in Europe This includes the four important innovations:

- An integrated services platform collecting data from a variety of biosensors to permanently monitor the medical status of the users.
- The Plug&Care connector, an interface to link any additional product or service supplier to the system.
- Newly to developed nano-sensors to measure additional data. Those sensors will provide feedback for the user enabling him to detect and prevent potentially unhealthy conditions, life styles and nutrition, especially for the fight against diabetes.
- An infrastructure of rural supply units serving as hubs for the users.
- The rural supply units (RSU) are village centres which integrate retail, service, communication and health facilities. The RSUs and the telemedicine system are closely related.

## **H@H**

### **Health@Home**

Budget: € 2.699.799 Starting Date: February 1, 2009 Duration: 30 Months

By using wearable sensors patients' physio-pathological cardiovascular and respiratory parameters are acquired and transferred to a remote server. The gathered data are continuously monitored by an automatic processing system and accessible by the medical staff, who can take action in case of necessity. The H@H system, which is based on a

Operating Protocol (OP), is directly integrated with the Hospital Information System (HIS). The OP consists of a set of actions that the patient must follow during the monitoring. The OP can be customized depending on the patient's needs and possible disease evolution when necessary. The actions are simple tasks like taking measurements or replying to simple questions. The system has the typical client/server architecture (see Figure 1). The client side is located at patient's home and consists of a home gateway and a set of biomedical sensors (see Figure 2). The server side, installed at the health service facilities, accepts and processes data from gateways making them available in the HIS.

## **HAPPY AGEING**

### **A Home based APPROach to the Years of AGEING**

Budget: € 1.673.779 Starting Date: April 1, 2009 Duration: 28 Months

HAPPY AGEING system will be composed of three main modules:

- A lifestyle monitor, able to record main activities taking place in the home and compare them with habits of the monitored subject.
- A navigation assistant to support the user in moving in close environment.
- A personal assistant characterized by two main groups of functions:
  - a) Support in reminding or performing actions;
  - b) Support in searching for personal objects such as spectacles or keys all around the home.

End users, their families and carers constitute the core of the project: their needs and expectations will drive all the design and development phases and will be completely assessed in the final pilot phase.

The end-users involvement will be completed by a field trial on 15 older people, in three countries (IT, HU, NL), including the analysis of the technical achievements/requirements, acceptance and usability of the prototypes, ergonomics and psychological aspects, and data for the Cost Benefit Analysis.

## **HELP**

### **Home-based Empowered Living for Parkinson's Disease Patients**

Budget: € 11.625.000 Starting Date: June 1, 2009 Duration: 36 Months

The HELP Project consortium is designing a Health Monitoring System specifically targeted for the needs of Parkinson Disease (PD) patients.

Without treatment, PD progresses over 5–10 years to a rigid, a kinetic state in which patients are incapable of caring for themselves. Death frequently results from complications of immobility, including aspiration pneumonia or pulmonary embolism. The availability of effective pharmacological treatment has altered radically the prognosis of PD; in most cases, good functional mobility can be maintained for many years, and the life expectancy increased substantially. Primarily, therapies are aimed at minimizing symptoms and maximizing function and quality of life. However, intensive supportive care is needed, demanding the allocation of enormous resources besides the strictly medical ones. This suggests an alternative way to face PD, not only in managing patients at an individual level, but also in optimizing cost effectiveness of health care plans. The HELP System ("Home-based Empowered Living for Parkinson's disease patients" proposes solutions to improve quality of life of PD patients based on:



- A Body Sensor and Actuator Network (BS&AN) made up of portable/ wearable and home devices to monitor health parameters (e.g. blood pressure) and body activity (e.g. to detect gait, absence of movement), and to release controlled quantity of drugs in an automatic fashion.
- A remote Point-of-Care unit to supervise the patients under clinical specialists control.

## **HERA**

### **Home sERVICES for specialised elderly Assisted living**

Budget: € 2.549.293 Starting Date: September 1, 2009 Duration: 36 Months

The project aims to provide a platform with cost-effective specialised assisted living services for the elderly people suffering from mild Alzheimer with identified risk factors, which will significantly improve the quality of their home life, extend its duration and at the same time reinforce social networking. The HERA platform will provide three main categories of services:

**Cognitive and physical reinforcement services:** These services will be a supplement of non-drug therapeutically interventions provided to the patient by specialised Alzheimer care centre.

**Patient specific home care services:** This service category will include social reinforcement services, reality orientation support services and services capable to monitor several Alzheimer related risk factors.

**General home care services for elderly:** This service category will include medication reminder services, information services as well as alarm services in cases of abnormal health conditions.

The HERA platform's architecture constitutes a pragmatic approach:

- All service functionality is provided at an external application server, which is accessible over the public Internet.
- The Internet-enabled TVs/Set-Top-Box provides the main Human Machine Interface for the elderly or the patient.
- The application server may communicate with other home equipment such as medical devices. HERA includes HYGEIA hospital and FRK (Austrian Red Cross) who ensure the direct involvement of elderly users throughout the project lifetime.

The consortium will carry out different installations of the platform in individual elderly households as well as centrally (at HYGEIA and FRK premises) so as to prove the efficiency of the HERA results and ensure that the final outcome really meets end user and market needs.

## **HMFm**

### **HearMeFeelMe**

Budget: € 1.600.000 Starting Date: July 1, 2009 Duration: 36 Months

The HearMeFeelMe project aims at developing ICT-based systems that provide elderly people with visual impairments an easy, simple and intuitive way to access information and digital services in their home environment, allowing them to

1. have equal opportunities to participate in all aspects of the society,
2. maintain their independency, avoiding dependency on others in order accessing information and services, and

3. improve the quality of life and individual wellbeing of the elderly.

The HearMeFeelMe project deals with the chronic condition of vision impairment. There are promising possibilities to support the visually impaired elderly in better managing their everyday lives with the help of modern information and communication technology. HMFEM explores the possibilities for improving the quality of life by providing mobile service access for the visually impaired elderly using services related to medication and medicine related information and services.

## **HOPE**

### **Smart HOme for the elderly People**

Budget: € 2.138.094 Starting Date: July 7, 2009 Duration: 24 Months

HOPE is a budgeted solution that is installed at the elderly people' homes, and provides services for

- a) life-long, self-organized, appropriate educational environment and access to information,
- b) care management and health support,
- c) self-monitoring and decision making.

The HOPE solution consists of an integrated, smart platform that manages a smart home with different functionalities for security, fall detection and communication. The system can be split up into two main blocks: the Server Block and the Home Block, which represent the main agent and every subsystem at each elderly user's home respectively. Home Block The Home Block covers functionalities associated to each person's environment monitoring, indicating alarms when necessary. Server Block The Server Block is responsible of the "thinking", decision-making functionalities of the system, including the following ones:

- Storage all information from any Home System;
- Alarm service in case of a fall detection to caregivers and relatives;
- Common information used by services or applications at Home block or used by related or doctors applications;
- Evaluation of information and provision of rules for estimating the most appropriated scenario;
- Synchronization with all Home databases;
- Interfaces to relatives and doctor to access to the different services.

## **IS-ACTIVE**

### **Inertial Sensing Systems for Advanced Chronic Condition Monitoring and Risk Prevention**

Budget: € 1.814.812 Starting Date: April 1, 2009 Duration: 36 Months

The project emphasizes the role of the home as care environment, by providing real-time support to patients. IS-ACTIVE proposes a combined technological solution, which uses intelligent miniaturized inertial sensing used for ambulatory human movement analysis, and wireless communication.

The IS-ACTIVE sensor-based system is meant to provide the patients:

- An effective sensing system for daily use, which analyses in real-time their physical activity and condition;
- An easy-to-use interface and a natural feedback, so that they become easily aware about the importance of self-management.

Field trials will be conducted in different locations and their results are expected to provide qualitative and quantitative indications on the system accuracy, robustness, reliability and usability, together with assessing the user experience regarding the motivation in self-managing the chronic condition.

## **PAMAP**

### **Physical Activity Monitoring for Aging People**

Budget: € 2771929 Starting Date: July 1, 2009 Duration: 36 Months

The PAMAP system comprises two separate conceptual parts: information acquisition and information management. Information acquisition is based on a network of sensors, e.g. miniature inertial sensors, which are worn by the subjects in order to measure their motions and other vital signs. Innovative information processing technology is then used to extract the relevant parameters of physical activity. The information management system consists of the infrastructure and applications that enable the system users – the monitored subject, her family and friends, and the clinicians – to share, review and analyse the collected activity data, exchange information, communicate and interact. A clinical study based on individualized exercise programs for fit and healthy elderly, cardiovascular and functional disease patients is planned at the end users site for the final project phase (November 2011 to March 2012).

## **REMOTE**

### **Remote health and social care for independent living of isolated elderly with chronic conditions**

Budget: € 3.410.726 Starting Date: June 1, 2009 Duration: 36 Months

Scale-up of existing research prototypes and development of new systems for collecting human- and context-related data will be deployed. These include wearable and sensors for detecting intra-oral miniature wetness and jaw movements, body temperature, heart rate, human posture, etc., as well as sensors and actuators to be installed in premises for providing context information, e.g., air temperature, human location and motion, etc. Ultimately, to support professionals to identify and react collaboratively to health risks by monitoring at anytime and from anywhere real-time, activity and medical data of isolated elderly, the project introduces an innovative, ontology-driven, open reference architecture and platform that will enable interoperability, seamless connectivity and data sharing among different services.

## **RGS**

### **Rehabilitation Gaming System**

Budget: € 2291001 Starting Date: April 1, 2009 Duration: 36 Months

The RGS will develop and test a novel virtual reality based system for the rehabilitation at home of motor disabilities of the upper extremities of elderly people after stroke. The Rehabilitation Gaming System (RGS) is a novel and highly innovative ICT Virtual Reality (VR) tool for the rehabilitation of motor deficits of the upper extremities after a brain lesion

due to stroke. The system deploys an individualized and specific deficit oriented game training that combines movement execution with the observation of a correlated action by virtual limbs that are displayed in a first-person perspective. The RGS is based on the neurobiological considerations that plasticity of the brain remains motor areas affected by stroke remains throughout life and can thus be utilized to achieve functional reorganization of areas affected by stroke by means of the activation of secondary motor areas such as the so called mirror neurons system. As a multi-level adaptive tool, the RGS provides a task oriented game training with individualized graded complexity. Additionally, the system retains qualitative and quantitative information of the performance of the subject/player during the tasks, hence allowing for a detailed assessment of the deficits of the patient player and their recovery dynamics. The RGS proof of concept is currently being evaluated in a randomized clinical study and the initial results with 14 patients have demonstrated positive impact.

## **ROSETTA**

### **Guidance and Awareness Services for Independent Living**

Budget: € 3.273.350 Starting Date: June 1, 2009 Duration: 36 Months

The functionalities of the ROSETTA system can be summarized as:

- Monitor activities of elderly persons with sensors.
- Generate alarm when unexpected/deviant (in) activity are predicted or detected (for example a falls).
- Generate warning when longer term deviations from the personal behaviour are detected.
- Support the elderly in carrying out daily and recreational activities.
- 

The ROSETTA system will be designed, pre-tested and evaluated in field trials with users (elderly people with dementia and their (in)formal carers) in three countries: Belgium, Germany and The Netherlands. The evaluation will focus on:

- User friendliness and usefulness of the system.
- Impact of the system on the autonomy, quality of life and delay of nursing home admission of elderly people with chronic disabilities, and burden and feelings of competence of their informal carers.

A business model will be developed to implement the developed ROSETTA system in regular care arrangements for elderly people with progressive chronic disabilities.

## **SOFTCARE**

### **Unobtrusive plug and play kit for chronic condition monitoring based on customized behaviour recognition from wireless localization and remote sensing**

Budget: € 1205832,94 Starting Date: November 1, 2009 Duration: 36 Months

The SOFTCARE project (funded under the AAL JP) has developed a prototype of a monitoring system for seniors that allow carers (formal and informal) and senior users to get real-time alarms in dangerous or potentially dangerous situations and warnings on long-term trends that could indicate a future problem. This objective is achieved by the implementation of the designed Artificial Intelligence techniques that allow the recognition of daily activities

based on the data obtained from an accelerometer (bracelet device) and location information. Users need to wear a bracelet containing a 3D-accelerometer and a Zigbee module that will communicate the bracelet (mobile node) with the rest of static devices on the user's home (one per room). Additionally, as a support tool, a full-duplex hands-free voice communications channel between emergency call-centre and seniors using SOFTCARE is also provided by the system using loudspeakers and microphones contained in the static nodes.

## 2.1.2 Summary table (projects of AAL call 1)

<b>Project</b>	<b>Starting date Duration</b>	<b>Total budget</b>	<b>Disabled / Elderly</b>	<b>Topic</b>	<b>Target</b>	<b>Technology</b>	<b>M€</b>
<b>A2E2</b> Adaptive Ambient Empowerment for the Elderly	May 1, 2009 48 Months	€ 3.074.485	D	Specific diseases	Diabetes type II and cardio- vascular diseases	Sensors for health monitoring	3,0
<b>AGNES</b> User-sensitive Home-based Systems for Successful Ageing in a Networked Society	September 1, 2009 36 Months	€ 3.635.371	E	Specific diseases	Mild cognitive impairment	web-based social network	3,5
<b>ALADDIN</b> A technology pLatform for the Assisted living of Dementia elDerly INdividuals and their carers	September 1, 2009 27 Months	€ 1.970.322	D	Specific diseases	Dementia	Sensors for health monitoring	2,0
<b>AMICA</b> Autonomy Motivation & Individual Self- Management for COPD patients	April 1, 2009 36 Months	€ 2.941.362	E	Elderly safety	Elderly health control	Sensor network	3,0

<b>Project</b>	<b>Starting date Duration</b>	<b>Total budget</b>	<b>Disabled / Elderly</b>	<b>Topic</b>	<b>Target</b>	<b>Technology</b>	<b>M€</b>
<b>BEDMOND</b> Behaviour pattern based assistant for the early detection and management of neurodegenerative diseases	June 1, 2009 36 Months	€ 2.379.179	D	Specific diseases	Dementia	Sensors for health monitoring	2,5
<b>CAPMOUSE</b>	June 15, 09 36 Months	€ 1.131.110	D	Specific diseases	Oral mouse	Special devices	1,0
<b>CARE</b> Safe Private Homes for Elderly Persons	July 1, 2009 30 Months	€ 2.380.000	E	Elderly safety	Elderly health control	Special devices	2,5
<b>CCE</b> Connected Care for Elderly Persons Suffering from Dementia	July 1, 2009 36 Months	€ 3.000.000	D	Specific diseases	Dementia	Sensors for health monitoring	3,0
<b>DOMEO</b> Domestic Robot for Domestic Assistance	July 1, 2009 36 Months	€ 2.400.000	E	Elderly help	Elderly	Robot	2,5
<b>eCAALYX</b> Enhanced Complete Ambient Assisted Living Experiment	May 1, 2009 36 Months	€ 4.118.002	E	Elderly safety	Elderly	Sensors for health monitoring	4,0
<b>EMOTIONAAL</b> Electronic Motion AAL Village	July 1, 2009 36 Months	€ 3.200.000	E	Elderly safety	Elderly	Sensor network	3,0

<b>Project</b>	<b>Starting date Duration</b>	<b>Total budget</b>	<b>Disabled / Elderly</b>	<b>Topic</b>	<b>Target</b>	<b>Technology</b>	<b>M€</b>
<b>H@H</b> Health@Home	February 1, 2009 30 Months	€ 2.699.799	D	Specific diseases	Physio- pathological cardiovascular and respiratory parameters	Sensors for health monitoring	2,5
<b>HAPPY AGEING</b> Home based APProach to the Years of AGEING	April 1, 2009 28 Months	€ 1.673.779	E	Elderly help	Elderly	Smart environment	1,5
<b>HELP</b> Home-based Empowered Living for Parkinson's Disease Patients	June 1, 2009 36 Months	€ 11.625.000	D	Specific diseases	Parkinson Disease	Sensors for health monitoring	11,5
<b>HERA</b> Home sERvices for specialised elderly Assisted living	September 1, 2009 24 Months	€ 2.549.293	E	Elderly safety	Elderly	Sensor network	2,5
<b>HMFM</b> HearMeFeelMe	July 1, 2009 29 Months	€ 1.600.000	D	Specific diseases	Visual impairments	Special devices	1,5
<b>HOPE</b> mart HHome for the elderly PPeople	July 7, 2009 24 Months	€ 2.138.094	E	Elderly help	Elderly	Smart environment	2,0



<b>Project</b>	<b>Starting date Duration</b>	<b>Total budget</b>	<b>Disabled / Elderly</b>	<b>Topic</b>	<b>Target</b>	<b>Technology</b>	<b>M€</b>
<b>IS-ACTIVE</b> Inertial Sensing Systems for Advanced Chronic Condition Monitoring and Risk Prevention	April 1, 2009 36 Months	€1.814.812	E	Elderly help	Elderly	Smart environment	2,0
<b>PAMAP</b> Physical Activity Monitoring for Aging People	July 1, 2009 36 Months	€ 2.771.929	E	Elderly help	Elderly	Sensors for health monitoring	3,0
<b>REMOTE</b> Remote health and social care for independent living of isolated elderly with chronic conditions	June 1, 2009 36 Months	€ 3.410.726	E	Elderly safety	Elderly	Sensor network	3,5
<b>RGS</b> Rehabilitation Gaming System	April 1, 2009 36 Months	€ 2.291.001	D	Specific diseases	Upper extremities	Virtual Reality	2,5
<b>ROSETTA</b> Guidance and Awareness Services for Independent Living	June1, 2009 36 Months	€ 3.273.350	E	Elderly safety	Elderly	Sensors for health monitoring	3,5

<b>Project</b>	<b>Starting date Duration</b>	<b>Total budget</b>	<b>Disabled / Elderly</b>	<b>Topic</b>	<b>Target</b>	<b>Technology</b>	<b>M€</b>
<b>SOFTCARE</b> Unobtrusive plug and play kit for chronic condition monitoring based on customized behaviour recognition from wireless localization and remote sensing	November 1, 2009 36 Months	€ 1.205.832	D	Elderly safety	Elderly	Artificial Intelligence	1,0
<b>TOTAL</b>		€ 67.283.449					

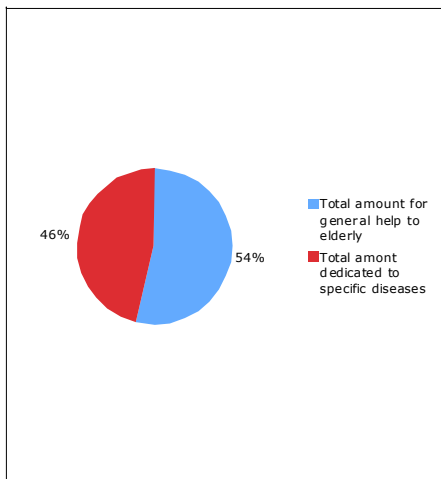
*Table 2.1.2-1: Summary table of AAL call 1 projects*

### 2.1.3 Considerations

From the above table we can infer that 22 projects were completed in the period February 2009 to April 2013 (most of them ended in 2012). The total amount dedicated to “elderly” was €36.306.718 and the amount employed for “specific diseases or disabilities” was €30.976.731 and total cost of call 1 was €67.283.449. The problems considered in each project have been grouped in :

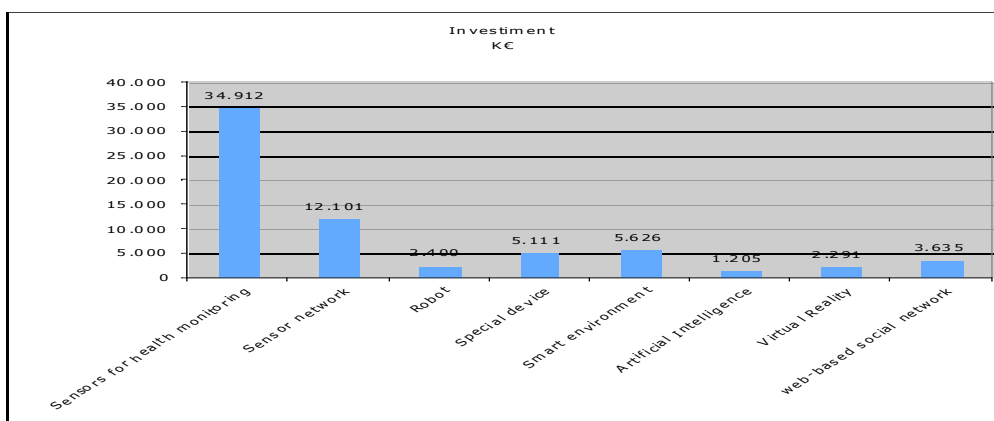
- Specific diseases
- Elderly safety
- Elderly help

Next tables (pie) show the percentage of the amount employed for different targets.

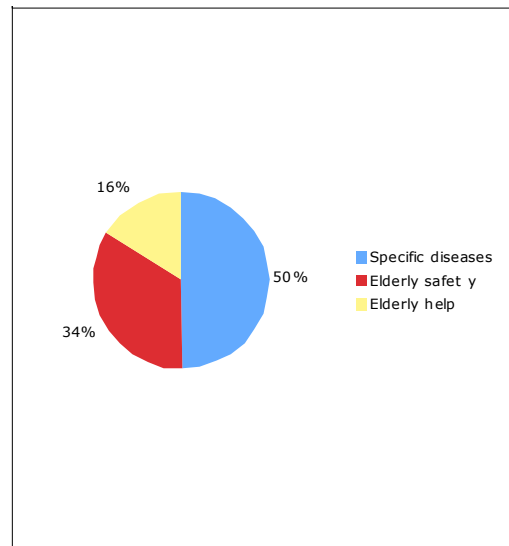


Graphic 2.1.3-2: Investments for disabled in AAL call 1

The following Graphic shows how the total amount employed for this call has been subdivided for each technology. Average cost of each project is € 2.925.367,3.



Graphic 2.1.3-3: Investment subdivided for each technology in AAL call 1



Graphic 2.1.3-1: Topic of AAL call 1 for elderly

Different and specific technologies were used in each project, but for simplicity we have grouped them in 8 categories:

- Sensors for health monitoring
- Sensor network
- Robot
- Special devices
- Smart environment
- Artificial Intelligence
- Virtual Reality
- Web-based social network

## **2.2 AAL projects call 2**

### **2.2.1 Short abstracts**

#### **3rD-LIFE**

##### **3D virtual environment for social interaction of elderly people**

Budget: € 1.700.000 Starting Date: July 1, 2011 Duration: 18 Months

The users will be represented as avatars, since the accessibility, usability and navigation will be central points. The target group is mainly people from 60 to 75 years old without specific cognitive problems. The operative objectives of the project will be: To develop a fully functional 3-dimensional computer simulation platform, to design and create the content of the platform on 3D environment that will constitute the functionalities, visual aspect and interaction possibilities and to include existing tools and applications (interoperability), through new adaptations to be used in the 3D virtual environment. 3rD-Life aims to validate the final solution in pilot testing in two EU countries to ensure the reliability, usability and adaptability to the final users' needs and to develop a detailed exploitation plan for the results of the project. Finally 3rD-Life will disseminate the project results to final users, public administrations and research community.

#### **ALIAS**

##### **The Adaptable Ambient Living Assistant One focus of the project lies on questions of social acceptance of robot systems in general and in specific within the named user groups.**

Budget: € 4.022.075 Starting Date: July 1, 2010 Duration: 36 Months

The consortium aims at integrating a commercial pilot that includes all state-of-the-art communication media. On top of the integration of existing solutions, two novelties will be introduced:

- a) A novel cognitive user interface concept is introduced to ensure a good usability
- b) A proactive behaviour of the robot platform will ensure that the user stays in contact with his surroundings and gets mentally stimulated;
- c) The third unique selling point is a Brain-Computer-Interface (BCI) that will be included in order to train and preserve the mental functions of the user.

#### **ALICE**

##### **Advanced Lifestyle Improvement system & new Communication Experience**

Budget: € 1.784.340 Starting Date: March 1, 2010 Duration: 24 Months

Elderly people often have limited mobility and may be housebound, often living some distance away from their friends and family. They can lose touch with their beloved ones and friends, becoming socially isolated and lonely.

The overall objective of ALICE is to enhance the quality of life, sense of well-being, social interaction and connectivity of elderly people in their home environments.

ALICE will research, develop and integrate a set of ICT based services into the existing TV set, allowing elderly people to enjoy experiences of communication and social interaction based on ICT. By doing this, ALICE will lead the way for elderly people to remotely share

moments of enjoyment, laughter and fun as if they were face-to-face with their loved ones. The central part, around which ALICE is developed, is a fit for purpose set-top box (STB) directly connected to an existing TV set.

## **AMCOSOP**

### **Ambient Communication for Sense of Presence**

Budget: € 2.406.849 Starting Date: October 1, 2010 Duration: 30 Months

AMCOSOP project is aimed at elderly people, with the goal of reducing their loneliness and fear of isolation. This will be accomplished by providing its users a sense of presence with their relatives, friends, and health care personnel, and assuring that the elderly are never left alone. In this project a software platform for managing communication and user-friendly terminal devices is developed. Information from people in the safety net is collected and displayed in visible form to the elderly, giving them the ability to decide when to initiate social connections, other activities or connect to a service provided by the system. With the system it is also possible to connect independently living people to service networks available in their region. As a new system is developed it brings new business opportunities for system developers, system administrators as well as for local system service integrators.

## **AWARE**

### **Ageing Workforce towards an**

Budget: € 1373875 Starting Date: July 1, 2010 Duration: 36 Months

The platform developed in the AWARE is based on:

- Environment adaptation module;
- Sharing knowledge module: This module will enable workers to maintain an active role after retirement;
- ICT approach module: This module will be a trainer tool for the platform and the provided services.

The platform will be developed using open-source software and the system will be modular in design to maximize flexibility and extensibility. Techniques of visual exploration and emotional analysis will be used to identify the preferences of ICT for the elderly people that they will use. This identification will be carried out with eye-tracking concept, monitoring and recording the way that people see a scene or image, the areas which fix its attention, the time and the order to see the elements in their visual exploration. A special attention will be focused in the pedagogical methodologies implemented in the platform (the educational models that will be considered will be: recreational, socio-cultural, interactive, etc.). The project aims at developing a Social Network totally designed basing on the requirements and the needs of the final users, and that will be integrated in the final platform with all the other modules.

## **Co-Living**

### **Virtual Collaborative Social Living Community for Elderly**

Budget: € 3.888.588 Starting Date: October 13, 2010 Duration: 36 Months

Co-LIVING is based on an innovative Social Community network (SoCo-net), integrating different mobile wireless ICT based services addressing the elderly social interaction context categories of Care & Wellness, Guidance and Mobility monitoring. The solution will utilize

and scale up the successfully developed IST FP6 mPower open source middleware platform to be applicable to the elderly social community interaction field achieving thus the expected Co-LIVING time-to-market perspective of 2 to 3 years after the project end. Co-LIVING target group is the big group of healthy elderly or with light physical or psychological health problems who are self-supporting, able to move around, and can still contribute actively. They find pleasure in getting help or stimulation to be active in an outward environment. The aim of choosing the specific target group is to prevent, or reduce the risk, that these people are spending most of their time at home as they get older for a variety of accumulated (physical, psychological, psycho-social and cultural) reasons.

## **Connected Vitality Network**

### **CVN**

Budget: € 2.518.060 Starting Date: Jun 1, 2010 Duration: 36 Months

Nothing exceeds meeting people eye-to-eye but new telepresence technology provides, however the second best. CVN results will be based on user oriented research of the elderly and elderly organisations, creating a network that supports:

- Family contact and activities – linking elderly with family, friends and relatives to support the social needs over distance;
- Care contact – linking elderly with their care professional and supporting the care plan;
- Community – linking elderly with the community based on shared interests, hobbies, pastimes and personal experiences.

## **Easyreach**

### **Fostering social interactions of home-bound and less educated elderly people**

Budget: € 3.190.173 Starting Date: November 1, 2010 Duration: 28 Months

The extensive verification and validation of the developed solution in real user contexts with the involvement of different groups of users will be one of the main characteristics of EasyReach. The goal will be to assess to which extent the solution meets the specific end user needs, how easily it can be accessed and used in spite of specific physical and/or cognitive age-related impairments and how much it is appealing and accepted by the users. The project uses fairly new technology, e.g. inertial units implemented by MEMS, to break the barrier between the user and the IT components that provide the service. At the same time, the interface is based on a TV with its well-known and non-intimidating interaction protocols. Key AI technology will be brought to bear from the areas of planning, for time line reasoning, and of logic for rule-based reasoning. The glue between all these components will be provided by the open-source social engine elgg.

## **Elder-Spaces**

### **Managing Older People Social Relationships for better Communication, Activation and Interaction**

Budget: € 2.423.859 Starting Date: April 1, 2011 Duration: 30 Months

Overall, Elder-Spaces will make sure that the platform appeals to people who are not familiar with technology without making users technophobes; on the contrary Elder-Spaces will be proposed as a means to optimizing quality of life (e.g., more recreation opportunities, improved healthcare and better mobility).

In the Elder-Spaces world:

- Applications are delivered in a human-centric manner.
- Face-to-face contacts remain important and Elder-Spaces acts as a facilitator to such contacts.
- Working life is of primary importance, since it is a decisive factor affecting older people's social life and Elder-Spaces acts as a facilitator and promoter of the "older worker" concept.
- Elderly users participate in the evolution of the platform.

## **ExCITE**

### **Enabling Social Interaction through Embodiment**

Budget: € 2.853.701 Starting Date: July 1, 2010 Duration: 30 Months

The ExCITE project methodology is highly inspired by a user-centric approach used for prototyping, validating and refining a solution in both multiple and evolving real contexts. In order for the results of the evaluations to be significant, prototype deployment must consider a large scale and a longitudinal perspective. This is possible in ExCITE because (1) a Giraff prototype designed to accommodate future needs already exists, (2) the members in the ExCITE project are geographically distributed in Italy, Spain and Sweden and (3) the end-user participation is closely tied to the consortium and project activities. Healthy adult volunteers have been selected at different end-user test sites. Each end user site has received a prototype to be tried and used for a period of time (up to 1 year). Currently test sites are ongoing and the Giraff has already been improved technically and in user interface to address the challenges encountered. Feedback shows a very positive response from elderly and families and outlines the challenges in penetrating the organizations.

## **Express to connect**

Budget: € 3.256.975 Starting Date: May 1, 2010 Duration: 36 Months

The E2C project follows a user-driven methodology, which divides the innovation process into two overlapping phases: A WHAT phase that focuses on what to produce and a HOW phase, which focuses on how to produce it. The process has several iterations leading to a refinement of product/service as it is being conceptualized, made tangible, tested, adjusted and tested again. Tipple bottom-line Applying a user-driven methodology enables both incremental and radical product and service innovation, and integrates business model with social innovation. As such the methodology is highly relevant when the aims are to improve

- 1) quality of life,
- 2) ensure sustainability of health and social services and
- 3) the creating of new jobs and business opportunities.

Data collection: the initial data collection has synthesized insights from the participating partners in relation to the issues of loneliness. Areas for further investigation were identified and validated through user workshops in all participating countries. Based on the initial inputs, an ethnographic research scheme was developed. Based on that in depth interviews with elders has been conducted in Denmark, Sweden, Finland and The Netherland.

## **FamConnector**

### **Activity Based Intergenerational Interactions**

Budget: € 1.527.639 Starting Date: April 1, 2010 Duration: 30 Months

FamConnector offers ground-breaking innovation in the area of intergenerational connectivity through its main components. They include:

- A library of inter-generational activities - including several types of activities, that grandparents can explore with their grandchildren.
- Generic inter-generational Interactive System (GIGIS) - a back end and communication (audio and video) system that directs technical aspects of functioning and integrating FamConnector as a white label product.
- Resource Center - a database of online resources and more.
- Developer Zone- for developers and distribution

End user testing is fully integrated in the project, as a repeating cyclical process mirroring the development process to guarantee current feedback that reflects the current status of the project throughout its progression

## **FoSIBLE**

### **Fostering Social Interactions for a Better Life of the Elderly**

Budget: Unknown Starting Date: May 1, 2010 Duration: 36 Months

The FoSIBLE approach builds on TV-based Social Interaction technologies in the context of Smart Living Rooms, using entertainment console and social media technologies to provide communication, interaction & entertainment services.

To fulfil our aim, FoSIBLE activities are organized in such a way that functionalities are designed and implemented into components to address specific user requirements that can be combined to support full-scale application scenarios. FoSIBLE prototypes are developed using a user centred and participatory approach. End-users from Austria, Germany and France are involved in the project. In addition, the end-user organization Les Arcades is in charge of evaluating the potential benefits of the solution.

## **Go-myLife**

### **Going on line: my social Life**

Budget: € 2.400.000 Starting Date: July 1, 2010 Duration: 30 Months

Go-myLife aims to improve the quality of life for older people through the use of online social networks combined with mobile technologies. The Go-myLife architecture consists of a core social networking platform connected to disparate social networking sites through middleware that essentially addresses personalization, security and integration-related requirements, with an easy and accessible interface. Other than controlling user access and authentication, the core platform will also manage privacy, trust and reputation through identity management and reputation systems. This will ensure that during any group interaction, users are aware of the information being shared and have aids available to control it. To assure interoperability and ubiquity, Go-myLife will provide a web-based solution

## **HELASCOL**

### **Helping elders to live an active and socially connected life by involving them in the digital society**

Budget: € 1.492.120 Starting Date: May 3, 2012 Duration: 36 Months

The “Helping elders to live an active and socially connected life by involving them in the



digital society” project addresses the objectives of the call by offering a 360 degree user involvement methodology to examine how a new approach towards digital technologies can be harnessed to support the involvement of elderly people in digital society. The proposal intends to synthesize the skills, experience and knowledge of the consortium members in developing a state-of-the-art platform and service package backed with feasible business models which supports the on time and on budget realization and market introduction of the call objectives. The project focuses on providing an enriched communication experience, anywhere, anytime and to any device with accessible, intuitive, easy to use, multimodal User Interfaces. We believe that the right service and the right content is only accepted by the end users if it is delivered on the right device, one that they are used to. This can be a tablet, the screen of the television, mobile phones, etc.

## **HOMEdotOLD**

### **home services advancing the social interaction of elderly people**

Budget: € 3.305.458 Starting Date: July 1, 2010 Duration: 24 Months

The HOMEdotOLD project aims to provide a TV-based platform with cost-effective services that will be delivered in a personalised and intuitive way and will advance the social interaction of elderly people, aiming at improving the quality and joy of their home life, bridging distances and reinforcing social voluntariness and activation, thus preventing isolation and loneliness. HOMEdotOLD will be primarily based on the Philips NetTV platform and secondarily on the AITA AonTV platform. More specifically, the whole bouquet of services will be implemented and provided to the users of the Greek, Austrian and Dutch pilot sites. The HOMEdotOLD consortium includes three partners who ensure the direct involvement of elderly users throughout the project lifetime, including requirements collection phase of the project, as well as the pilot trial activities that will take place at least twice during the project.

The project main objectives are:

- to provide the appropriate platform based on INHOME and Net TV technologies for supporting the services described above advancing the social interaction of the elderly people;
- to provide services allowing the elderly to stay socially active including the "social working" and the "personalised news headlines" services;
- to provide services for bridging distances and supporting elderly people's existing roles, including the "videoconference", the "remote dining", the "photos, videos, experience sharing" and the "intelligent calendar" services;
- to install the HOMEdotOLD pre-product prototype and perform trials at pilot sites by involving real elderly users;
- to evaluate and demonstrate the commercial feasibility and the business potential of the HOMEdotOLD services by preparing a realistic business and exploitation plan.

## **HOPES**

### **Help and social interaction for elderly On a multimedia Platform with E-Social best practices**

Budget: € 4.997.878 Starting Date: September 1, 2010 Duration: 30 Months

Taking into account end-users requirements, expectations and social experiences, HOPES will integrate a range of ICT-based solutions for:

- managing existing e-information by exhaustive search of existing data;
- then transforming selected information into personalised solutions;
- and finally providing validated solutions as “e-Social Best Practices” (SBP)®.

This stepwise process represents the “HOPES virtuous circle” for transforming raw data into knowledge (e-SBP®) with help of many European organisations (end users). The technology will support interoperability and multiple roles as content user and provider, semantic technologies for semantic similarity reasoning and routing, human – system interfaces adapted to the elderly and a single but multilingual access point to share HOPES e-SBP® all over Europe.

## **Join-In**

### **Senior Citizens Overcoming Barriers by Joining Fun Activities**

Budget: € 3.033.000 Starting Date: November 1, 2010 Duration: 36 Months

Join-In aims to support the AAL Joint Programme by setting up a social platform and thus creating an environment that enables elderly people to communicate; socialise; play communicative multiplayer computer games; and exercise either by exergames or by moderated exercises. Join-In will support people maintaining and setting up contacts to others sharing similar interests -foremost on a regional basis- and facilitate contact to family and friends. Multiplayer video gaming, exercising in a group are considered key activities for attracting senior citizens to the network. Join-In will assess the user requirements aims to develop a methodology on how to best attract the target group to such a network. The technical developments of the project include

- A technical platform that connects to PCs or TVs with an interactive web-enabled set-top box;
- The customisation of access facilities, such as controllers and adaptation of games which take into account the constraints of senior citizens;
- the development of computer-/ exergames and virtual exercising for the targeted user group.

## **M3W Maintaining and Measuring Mental Wellness**

**M3W project attempts to utilize the fact that on-line games are able to collect behavioural data in order to measure mental (and motor) abilities and especially their changes over time.**

Budget: € 2.100.000 Starting Date: December 1, 2011 Duration: 36 Months

If we can measure states and state changes in a scientifically sound way and a strictly controlled environment then we can provide better and more help in time for the elderly and their families. The main objective of the project is to develop a mental wellness toolset for self-usage (i.e. for the individuals and their families), and to a lesser extent for the medical experts (psychiatrists, psychologists, carers, etc.). The goal is to measure and visualize mental changes, tendencies in an entertaining way, and to give indications, sort of warnings, alarms or reports, to the effected persons and their relatives, friends that it is advisable to visit a physician. Our ambition is to compare one’s mental wellness to his/her own past mental wellness conditions (in relative values), while it is not our aim to compare one’s mental ability to others’ one. ICT & web technologies should be used out maximally.

## **Nostalgia Bits**

**Reminiscing is a pleasurable activity for seniors and can improve their wellbeing by providing rich opportunities for communication with peers and family.**

Budget: € 3.469.730 Starting Date: May 3, 2010 Duration: 24 Months

The Nostalgia Bits (NoBits) project aims at fostering social interaction between elderly and their family, through capturing their memories, and thereby personal, family and local history embodied by letters, newspapers, postcards, photos and other documents. A web-based platform is being developed where tangible artefacts of an elderly person's life experience can be uploaded and become a significant resource for use by other generations, and a means for connecting the elderly users with members of their own generation. Nostalgia Bits will thus be more than an "on-line community" service. It aims to be one of the first examples of what we call an "augmented community" service. Augmented communities combine the benefits of interest-bound communities (typically supported by on-line services) with the benefits of geographically-bound communities (which lead to rich, face-to-face interactions).

## **OsteoLink**

**OsteoLink is the first online and in-person social network dedicated to osteoporosis in Europe and Australia.**

Budget: CHF 1.845.583 (= € 1.516.813 at 11/04/2014) Starting Date: April 1, 2010  
Duration: 20 Months

In Summer 2009, a multi-national survey commissioned by the University of Geneva, the International Osteoporosis Foundation (IOF) and their partners, of over 1,600 people with osteoporosis and health professionals highlighted specific communications needs around treatment adherence challenges in osteoporosis, which persist despite widespread awareness-raising efforts. Overall, the results indicated a need for easy-to-understand information for patients, helping them to have better conversations with their health providers. OsteoLink was created to respond to this need and to support greater interaction in the osteoporosis community. It builds on the growth of the internet in patient advocacy

## **PaeLife**

**Personal Assistant to Enhance the Social Life of the Seniors**

Budget: € 1.700.964 Starting Date: February 24, 2012 Duration: 24 Months

Starting with an analysis of the existing Internet services and household ICT devices/gadgets targeted to the citizens and, in particular, to the elderly, that enhance social life and productivity, we will study the existing HCI gaps that hinder their effective adoption by the elderly.

From these international studies we will select a set of Internet services and domestic ICT devices and will generate credible usage scenarios and derive corresponding user requirements and pilot applications. The project expects to empower the elderly users with a Personal Life Assistant (PLA), that will mediate and facilitate the interaction of senior citizens, with technological devices such as computers, tablets, game consoles, smart-phones and home automation modules. PLA will improve the accessibility to existing services in the web, such as interactive online courses, social and entertainment media. All this will be made possible at people's homes, since elderly have sometimes some level of impairments caused by age, which reduces their mobility.

## **PeerAssist**

### **A P2P platform supporting virtual communities to assist independent living of senior citizens**

Budget: € 2.147.151 Starting Date: September 1, 2010 Duration: 30 Months

PeerAssist will provide an accessible, adaptable, multimodal and multilingual user interface and integrate behind the scenes the appropriate knowledge and context management and peer-to-peer interaction as needed to allow elderly people using the system to build virtual communities on demand, based on interests and needs that they share among themselves and/or with people in their supporting environment. The main effort of this challenging project is to design a Peer-to-Peer (P2P) platform helping the elderly fulfil their everyday needs in a user-friendly, effective, and totally safe manner. Use of PeerAssist by an elderly end-user should not require computer literacy. User supporting entities (e.g. family members, friends, caregivers, etc.) that participate in PeerAssist may use similar terminals or more powerful off the shelf computers as needed, depending on their role and function, level of computer expertise and services they provide. All terminals will be connected to the Internet and communicate via a peer-to-peer overlay technology.

## **SeniorChannel**

### **an Interactive Digital Television Channel for Promoting Entertainment and Social Interaction amongst Elderly People**

Budget: € 4.336.084 Starting Date: March 1, 2010 Duration: 36 Months

SeniorChannel will give elderly care professionals an innovative approach to developing and managing the specific social needs of the elderly in the wider community. To achieve this goal, SeniorChannel will develop an Interactive Internet Protocol Television Channel (SENIORCHANNEL) that will not only provide elderly people with a method of interacting but also with a unique means of access to the range of diverse activities in their community including the opportunity to share knowledge and experience, the ability to participate in topical debates, entertainment services, work-shops and discussion groups regardless of their geographical location. The integrated system will be tested and evaluated, setting up a TV studio and production centre in Spain and broadcasting programs to a pilot user group. The feedback generated during user testing will provide the basis for modification and refinement thus bringing the design of the application more into line with the preferences and needs of those involved.

## **SENIORENGAGE**

### **Virtual network to empower the integration of seniors into an active community in the post retirement years**

Budget: € 1.272.595 Starting Date: December 1, 2010 Duration: 24 Months

SENIORENGAGE will provide a practical networking platform which seniors and new professionals may network with each other, and which comprises the following: RetiredProf System: This module will allow retired seniors to continue to their professions through shared knowledge, becoming mentors of young professionals and guiding them through the challenges of their career. ProfBuddies: Retired seniors of a certain professional area will be able to interact and network with each other, through the use of groups, message boards, instant messaging and a variety of Web 2.0 features. SeniorConsult: Older adults prior to retirement will be able to provide their advice to businesses or non-profit organizations in

need of answers to simple question. In this way, professional seniors will be able to provide support to younger ones, contributing to their sense of self-worth.

## **SI-Screen**

### **Social Interaction-Screen, SI-Screen**

Budget: € 2.744.500 Starting Date: October 1, 2010 Duration: 30 Months

The core idea is to integrate new web based services such as internet telephony, instant messaging (e.g. Skype), group calendars (e.g. Google Calendar) and various types of social software (e.g. facebook.com, flickr.com, youtube.com, twitter.com) as well as applications of non-electronic service providers (leisure local offers, theatre, cinema...) into intuitively usable touch screen devices e.g. in form of digital picture frames. The SI-Screen project aims to make technology tool useful, attractive and usable by every user, especially elderly people. Therefore the SI-Screen is focusing on images and new concept far from the old WIMP paradigm (Window, icon, menu, pointing device), which is very easy to understand and provide together with the touch screen an intuitive handling. In addition, the age-related cognitive changes require an additional focus on accessibility and usability. To include the needs and interests of the elderly end user will be heavily involved.

## **SilverGame**

### **A platform for serious gaming to foster the social inclusion of elderly people**

Budget: € 2777061 Starting Date: May 1, 2010 Duration: 26 Months

The envisioned platform is conceived as an integrated solution which combines sensor-controlled serious gaming, web-based information services and interactive entertainment and which brings all that onto a standard television set – a technological environment elderly people are so much more familiar with than a PC. Regarding an appropriately intuitive controller, the Silver- game consortium has been doing successful user acceptance tests with a specially interfaced touchscreen application running on an iPad or tablet PC. Using open standards and allowing for interoperability the Silvergame platform wants to make future upgrades of the pilot applications just as easy as the integration of new applications at a later point in the development.

The Silvergame prototype will include three interactive modules on one central platform:

- A virtual silver song club, where people meet to sing with each other;
- A multimedia driving simulator for cognitive training of traffic situations;
- A sensor-based dance and fitness training application.

## **SoMedAll**

### **Social Media for All Elderly People**

Budget: € 1.000.000 Starting Date: February 1, 2010 Duration: 24 Months

A prototype service will be implemented and tested among the seniors over national borders. SoMedAll project produces a platform that offers social media focused on the needs of the elderly with a variety of easy-to-use user interfaces including web, PC, IPTV and mobile phone

(

already at home) taking into account the skill levels of the users. We implement a prototype

service, test use it among the elderly over national borders. We study the usability and the impact of the services to the life quality of the elderly. End-users' point of view will be taken into account in practice in Italy, Finland and possibly in Slovenia. One important issue is also to analyse possible cultural effects on the acceptance and desire for these kinds of social media services.

## **TAO**

### **Community & Collaboration**

Budget: € 3.000.000 Starting Date: October 1, 2010 Duration: 36 Months

The project is divided into two strands, one aiming at the development of non-technical solutions, and the other pursuing technical solutions. Non-technical solutions aimed for by the project can be roughly divided into “methods for mobilisation”, “methods for inclusion & motivation”, and the “creation of new types of online content and activities”. The methods developed to encourage elderly people to participate actively in online communities will result in a draft inventory of methods and in corresponding guidelines. Both, the inventory and the guidelines are intended to serve as a basis for consulting activities in the field of online communities. In order to develop and to implement new methods and activities as well as to develop the guidelines, the project heavily relies on the “action research” methodology, which allows to bring about, to observe and to evaluate social change through active interaction between researchers, elderly people, and other stakeholders in the field.

## **TRAINUTRI**

### **TRAINing and NUTRition senior social platform**

Budget: € 3416850,20 Starting Date: May 1, 2010 Duration: 24 Months

The Trainutri Consortium provides IT based end-user services, combining intelligent wireless sensor network technologies, data processing, Web 2.0 and social network models and a web portal providing user feedback on goals achieved and supporting interaction with peers. End-users can communicate using the web portal, their smart phone or both. Through analysis of acceleration meter activity, an estimation of walking activity and used calories, per day will be provided. An extension with activity recognition technology and a global positioning module makes it possible to advise the user about integrating exercise goals and nutritional goals in daily life. The older adult target group is focus on those to choose to carry out a healthy lifestyle. They will be able to build a healthy personal environment configuring their activities according to their condition and preferences. They will count on direct professional support to make this healthy personal environment consistent.

## **V2me**

### **Virtual coach reaches out “to me” V2me**

Budget: € 3.600.000 Starting Date: May 1, 2010 Duration: 36 Months

Overcome Loneliness V2me combines real life and virtual social network elements to prevent and overcome loneliness in Europe's aging populations. It supports active ageing by increased integration in the society through the provision of advanced social connectedness and social network services. Social Innovation The V2me system will allow the elderly user to communicate and engage in social activities with friends, family and caregivers via easy-to-use devices with specifically designed user interfaces. Giving the user the ability to appear to the outside world in the way he desires. User-Centred Design The V2me system will be tested

in three different pilot sites in three different countries, evaluating usability, user experience and acceptance of core functionality. Additionally a long term evaluation will be performed in Amsterdam, Netherlands that will assess the effects on the system on the perceived loneliness of elderly persons. It is planned to perform this study on 180 subjects.

## **WeCare**

### **AAI WeCare 2.0**

Budget: € 3.670.000 Starting Date: February 11, 2010 Duration: 36 Months

The end users gave valuable input during the interviews and meetings with representatives of the end users' group and during co-design sessions.

The 'baseline' gave an excellent basis for further discussions. It is a generic platform with several services like a calendar, local news and events, medicine reminder that is set via internet and sends text messages (SMS) to the mobile phone of the user. The second year of the WeCare project trials will show what end users think of the WeCare 2.0 services in each country and how the envisioned business models will work out. For example in Spain the tele carers may receive less calls from people who are just in for a chat and therefore will have more time for urgent calls. Participants in the trials will all cooperate in the research which accompanies the WeCare project. They will give their input through a mix of questionnaires regarding wellbeing and loneliness issues, their expectations of the service and user experience, etc. This will provide the WeCare project group with valuable and comparable data.

## 2.2.2 Summary table (Projects of AAL Call 2)

Project	Starting date Duration	Total budget	Disabled /Elderly	Topic	Target	Technology	M€	More tech information
<b>3rD-LIFE</b> 3D virtual environment for social interaction of elderly people	July 1, 2011 18 Months	€ 1.700.000 €	E	Socialize	Virtual envirnment	Augmented reality	1,7	
<b>ALIAS</b> The Adaptable Ambient Living Assistant	July 1, 2010 36 Months	€4.022.075	E	Socialize	Mental stimulation	Robot	4,0	
<b>ALICE</b> Advanced Lifestyle Improvement system & new Communication Experience	March 1, 2010 24 Months	€ 1.784.340	E	Socialize	Social interaction	Special devices	1,8	Set-top box
<b>AMCOSOP</b> Ambient Communication for Sense of Presence	October 1, 2010 30 Months	€ 2.406.849	E	Socialize	Social interaction	Special devices	2,4	
<b>AWARE</b> Ageing Workforce towards an Active Retirement	July 1, 2010 36 Months	€ 1.373.875	E	Socialize	Active retirement	Special devices	1,4	Emotional analysis
<b>Co-Living</b> Virtual Collaborative Social Living Community for Elderly	October 13, 2010 36 Months	€ 3.888.588	E	Socialize	Social interaction	Web-based social networks	3,9	
<b>CVN</b> ConnectedVitality Network	June 1, 2010 36 Months	€ 2.518.060	E	Socialize	Social interaction	Web-based social networks	2,5	



<b>Easyreach</b> Fostering social interactions of home-bound and less educated elderly people	November 1, 2010 28 Months	€ 3.190.173	E	Socialize	Social interaction	Web-based social networks	3,2	TV
<b>Elder-Spaces</b> Managing Older People Social Relationships for better Communication, Activation and Interaction	April 1, 2011 30 Months	€ 2.423.859	E	Socialize	Facilitate the use of technology	Web-based social networks	2,4	
<b>ExCITE</b> Enabling Social Interaction through Embodiment	July 1, 2010 30 Months	€ 2.853.701	E	Socialize	Social interaction	Robot	2,9	
<b>Express to connect</b>	March 1, 2010 36 Months	€ 3.256.975	E	Socialize	Social services	Special devices	3,3	Software with data collection related to loneliness
<b>FamConnector</b> Activity Based Intergenerational Interactions	April 1, 2010 30 Months	€ 1.527.639	E	Socialize	Intergenerational connectivity	Special devices	1,5	Databases
<b>FoSIBLE</b> Fostering Social Interactions for a Better Life of the Elderly	May 1, 2010 30 Months	Unknown	E	Socialize	Interaction and entertainment	Web-based social networks	Unknown	TV
<b>Go-myLife</b> Going on line: my social Life	July 1, 2010 30 Months	€ 2.400.000	E	Socialize	Social interaction	Web-based social networks	2,4	Mobile technologies
<b>HELASCOL</b> Helping elders to live an active and socially connected life by involving them in the digital society	May 3, 2012 36 Months	€ 1.492.120	E	Socialize	Social interaction	Special devices	1,5	Digital communication

<b>HOMEdotOLD</b> home services advancing the social interaction of elderly people	July 1, 2010 24 Months	€ 3.305.458	E	Socialize	Social interaction	Web-based social networks	3,3	TV
<b>HOPES</b> Help and social interaction for elderly On a multimedia Platform with E- Social best practices	September 1, 2010 30 Months	€ 4.997.878	E	Socialize	International interaction	Special devices	5,0	Multilingual access point/interface
<b>Join-In</b> Senior Citizens Overcoming Barriers by Joining Fun Activities	1 November 1, 2010 36 Months	€ 3.033.000	E	Socialize	Virtual exercising	Web-based social networks	3,0	Exergames
<b>M3W</b> Maintaining and Measuring Mental Wellness	December 1, 2011 36 Months	€2.100.000	E	Measure mental (and motor) abilities		Special devices	2,0	
<b>Nostalgia Bits</b> Reminiscing is a pleasurable activity for seniors and can improve their wellbeing by providing rich opportunities for communication with peers and family	May 3, 2010 24 Months	€ 3.469.730	E	Socialize	Mental stimulation	Web-based social networks	3,5	
<b>OsteoLink</b> (T-Break)	April 1, 2010 20 Months	CHF 1.845.583 <sup>4</sup>	E	Specific diseases	Osteoporosis	Web-based social networks	1,4	

<sup>4</sup> = € 1.516.813 at 11/04/2014

<b>PaeLife</b> Personal Assistant to Enhance the Social Life of the Seniors	February 24, 2012 24 Months	€ 1.700.964	E	Socialize	Mental stimulation	Web-based social networks	1,7	
<b>PeerAssist</b> A P2P platform supporting virtual communities to assist independent living of senior citizens	September 1, 2010 30 Months	€ 2.147.151	E	Socialize	Virtual environment	Special devices	2,1	Peer-to-Peer platform
<b>SeniorChannel</b> An Interactive Digital Television Channel for Promoting Entertainment and Social Interaction amongst Elderly People	March 1, 2010 36 Months	€ 4.336.084	E	Socialize	TV channel	Special devices	4,3	Internet TV channel
<b>SENIORENGAGE</b> Virtual network to empower the integration of seniors into an active community in the post retirement years	December 1, 2010 24 Months	€ 1.272.595	E	Socialize	Social interaction	Web-based social networks	1,3	
<b>SI-Screen</b> Social Interaction-Screen, SI-Screen	October 1, 2010 30 Months	€ 2.744.500	E	Socialize	Facilitate the use of technology	Web-based social networks	2,7	Software games and Internet applications
<b>SilverGame</b> A platform for serious gaming to foster the social inclusion of elderly people	May 1, 2010 26 Months	€ 2.777.061	E	Socialize	Interaction and entertainment	Web-based social networks	2,8	Serious games

<b>SoMedAll</b> Social Media for All Elderly People	1 February 1, 2010 24 Months	€ 1.000.000	E	Socialize	International interaction	Web-based social networks	1,0	
<b>TAO</b> Community & Collaboration	October 1, 2010 36 Months	€ 3.000.000	E	Socialize	Facilitate the use of technology	Web-based social networks	3,0	Multilingual access point/interface
<b>TRAINUTRI</b> TRAINing and NUTRItion senior social platform	May 1, 2010 24 Months	€ 3.416.850,20	E	Health	Measure and monitor	Sensor networks	3,4	
<b>V2me</b> Virtual coach reaches out “to me” V2me	May 1, 2010 36 Months	€ 3.600.000 €	E	Socialize	Social interaction	Web-based social networks	3,6	
<b>WeCare</b> AAI WeCare 2.0	February 11, 2010 30 Months	€ 3.670.000 €	E	Health	Measure and monitor	Sensor networks	3,7	Creating services
<b>TOTAL</b>		€81.555.108						

*Table 2-2-2-1: Summary table of AAL call 2 projects*

### 2.2.3 Considerations

This call was characterized by the large predominance of projects dedicated to socialization of the elderly.

Topic	Budget	# of projects
Socialize	72.222.675	28
NO Socialize	11.032.433	4
<b>Total</b>	<b>83.255.108</b>	<b>32</b>

Table 2.2.3-1: Budget for socialize projects

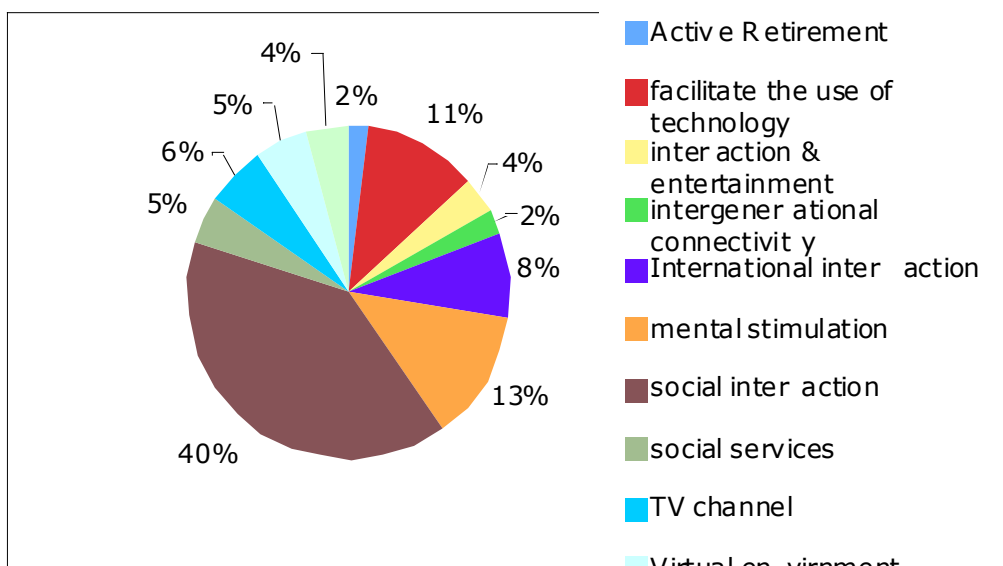
Topic	Budget	# of projects
Socialize	72.222.675	28
Measure & monitoring	9.186.850	3
Specific diseases	1.845.583	1
<b>Total</b>	<b>83.255.108</b>	

Table 2.2.3-2: Budget for topic call 1

As the predominant topic of this call was “Socialize, in order to classify in major detail the project we have grouped them in sub-category and we have obtained the following table and graphics.

Sub category	Budget	# of projects	Average cost
Active Retirement	1.373.875	1	1.373.875
Facilitate the use of technology	8.168.359	3	2.722.786
Interaction & entertainment	2.777.061	2	1.388.531
Intergenerational connectivity	1.527.639	1	1.527.639
International interaction	5.997.878	2	2.998.939
Mental stimulation	9.192.769	3	3.064.256
Social interaction	28.711.884	11	2.610.171
Social services	3.256.975	1	3.256.975
TV channel	4.336.084	1	4.336.084
Virtual environment	3.847.151	2	1.923.576
Virtual exercising	3.033.000	1	3.033.000
<b>Total</b>	<b>72.222.675</b>	<b>28</b>	

Table 2.2.3-3: Budget subdivided for sub category



Graphic 2.2.3-1: Percentage of projects and budget for each sub category

We can deduce then projects dedicated to “TV Channel” and “Virtual exercising” where the most expensive and the “Active Retirement” and “Interaction & entertainment” had the lover cost.

## **2.3 AAL projects call 3**

### **2.3.1 Short abstracts**

#### **2PCS**

##### **Personal Protection and Caring System**

Budget: €1.741.213 Starting Date: July 1, 2011 Duration: 24 Months

The 2PCS solution is based on a unique combination of innovative software features and a mixture of state of the art technologies aligned to a life-phase oriented business process logic. A modular approach allows for individual customisation and thus personalised and adjusted services for end- users. Depending on the end-users' needs, all features and services can be activated as well as deactivated by the user or by an entitled secondary end-user. In Order to ensure that the 2PCS solution addresses the life-phase challenges as good as possible, primary end-users, secondary end-users as well as tertiary end-users are integrated into the development process of services and functions. Next to a set of research activities various end-user-groups will be able to participate in idea gathering, defining requirements, use cases, innovation processes and pilots aligned to various life-phases. Regardless of age-groups, the solution is targeted at various user groups who need functions and services based on their distinct life-phases, challenges and needs.

#### **AA Luis**

##### **Ambient Assisted Living user interfaces**

Budget: €3.238.624 Starting Date: July 1, 2011 Duration: 36 Months

The user interface (UI) is an important feature of interaction between the human and the machine (services). Thus the main focus of the project lies on the development of innovative UIs and a layer for the easy and standardized integration of new and existing UIs. The aim is to build these interfaces and the connection layer on open and already existing middleware platforms. The improvement of the user interfaces and thus of devices and solutions for older people based on design for-all principles shall improve older people's access to, acceptance of and use of ICT-based services. End-users' needs and abilities in their (daily) life are explored by two user organizations from the very beginning of the project following ethical and user involvement guidelines. In addition needs of technical stakeholders, such as developers and services providers, when creating AAL Systems will be taken into account.

#### **ALFA**

##### **Active Living For Alzheimer-patients**

Budget: €2.162.987,24 Starting Date: January 1, 2012 Duration: 24 Months

By means of three different technologies, visual stimulation of mirror neurons in Alzheimer patients, an interactive agenda or diary and a movement monitoring system, people with dementia will be able to improve or sustain their cognitive functions. By developing, integrating and testing these technologies in homecare and residential settings we will demonstrate that it will improve conditions for Alzheimer patients by offering them personalised support through ICT.

#### **AMCO**

##### **Ambient Concierge**

Budget: €2.620.726,85 Starting Date: November 1, 2011 Duration: 36 Months

The main areas of AAL are assessed by the AmCo project. Project work will be done in two sequential phases. In the beginning of the first phase, two existing AAL systems will be presented by the specific operators to all pilot users to gain a common knowledge base. The main purpose of the first phase is the installation of the existing systems in different regions and the operation by the end-users.

During the usage time the users are interviewed concerning their pattern-of-use, which services are mostly used, which are obsolete or which services are desired in addition. The results of the first phase are used in the second phase to design and develop the new AmCo platform containing existing and new services. Moreover the second phase will be used to determine if there exist demographical or geographical discrepancies concerning the use of the AmCo platform or the set principally used services. Therefore the end-users are interviewed a second time. These deliverables will help to design further scenarios in future AAL-projects.

## **BANK4ELDER**

### **Innovate ways of banking designed for and by the elderly**

Budget: €1.723.108    Starting Date: October 1, 2011    Duration: 36 Months

Bank4Elder project will develop and validate new interfaces for existing ways of banking. Each mode and technology will be:

- Web: Building new web pages will allow end users to choose between normal or personalized web page just to of fits its needs.
- ATM: We will offer users an easy and practical way to handle information shown in the screen.
- Mobile: standardized interfaces for most relevant operating systems (iPhone, Android, etc..) will be provided.
- TV: alternative ways to interact with TV (remote control doesn't work)

New innovate testing technologies will be used to test interfaces operability in elderly people: conjoint analysis, physical response analyse, behaviour analyse, usability tests and pilot testing. End users will also participate in some project tasks helping developers to build this solution.

## **Care@Home**

### **CARE AT HOME services advancing the social interaction, health wellness and well-being of elderly people**

Budget: €3.907.881,34    Starting Date: November 21, 2011    Duration: 36 Months

Care@Home involve continuous, automatic and remote monitoring (e.g. by mobile phone/wireless / fixed sensors) of real time emergencies and lifestyle changes over time in order to manage the risks associated with independent living. Care@Home enables such care services to the home environment without the prohibitive costs of retrofitting existing dwellings. Care@Home aims at creating an open platform able to enable services to elderly who care to live independently while enjoying the assurance of timely access to caregivers when needed and thereby offer better living which provides elderly around the world with a sense of security, comfort and joy.

## **ELDERHOP**

### **Solution Assisting the Shop Hopping of Elderly**

Budget: €1.777.488 Starting Date: September 1, 2011 Duration: 24 Months

ELDERHOP is creating a solution which runs on existing and future open source mobile and IP connected TV platforms. Mobile platforms and devices (both tablets and smartphones) will be selected based on the collected end-user expectations and usability studies. Easy-to-use mobile interfaces will be created and tested which will ensure the easy navigation for elderly people. Homesys will develop an easy-to-use comparison shopping IPTV application that will allow users to see which products are available at which store and for what price. The application will also make use of the possibility of NFC payment. Further applications (such as an alarm button, location tracking, etc.) will also be integrated. Field trials will be organized in Hungary and in Austria and end-to-end solutions will be available for demonstration in order to ensure a good end-user evaluation. During the field tests, trained mentors will help the elderly test subjects to learn how to use the applications.

## **ENTRANCE**

### **Enabling Elderly People travel and Internet Access**

Budget: €4.385.128 Starting Date: September 1, 2011 Duration: 36 Months

The ENTRANCE project gathers leading European research institutions, user organisations and SMEs. It focuses on the development of the ENTRANCE platform, which comprises a home terminal and a multimodal mobile interface for way finding. The home terminal consists in a usable hardware (a silent computer to be used in living rooms) and software adapting to users with different levels of technology proficiency. The software is used to learn how to book e-tickets and vacation packages. The ENTRANCE platform also comprises a serious game to be used by older adults to improve their spatial competence and, subsequently, their ability to navigate indoors and outdoors. The mobile platform comprises navigation software, which is also used in the serious game on the home platform. This navigation software will be installed on a smart phone, and combined with outdoors and indoors positioning system, and a haptic navigation device (e.g. a wristband) for giving directions, and informational messages during navigation.

## **FEARLESS**

### **Fear Elimination As Resolution for Loosing Elderly's Substantial Sorrows**

Budget: €2.700.000 Starting Date: July 1, 2011 Duration: 36 Months

As elderly often refuse to wear any additional sensors to activate alarm calls, FEARLESS will visually and acoustically detect and handle risks by contacting the relatives or care taker organization (e.g. TES or SAM) automatically without the need of any user intervention. It increases the feeling of safety, reduces fears, enhances the self-efficacy and thus enables elderly to be more active, independent and mobile in today's self-serve society. FEARLESS does not only enhance the mobility by reducing fears but also triggers an alarm, if significant behavioural changes (e.g. less mobility, change of health condition and many others) are detected. Thus, relatives or care taker organizations are able to ensure the physical and psychological wellbeing of the primary end users. The user are involved throughout the entire project, as their needs and wishes are examined in regular feedback intervals - as well as their feasible concerns about their privacy.



## **FOOD**

### **Framework for Optimizing the prOcess of FeeDing**

Budget: €3.232.865,99      Starting Date: September 1, 2012      Duration: 36 Months

The devised solution consists of a home-based system that enables elderly people to deal with feeding and food-related tasks in a safe, effective and rewarding way. It is based on the seamless integration of sensors, intelligent appliances able to offer functionalities in the house and Internet based services and applications, able to give access, through a natural interface, to information and communication in different social environments. Its innovation lies in the integration and cooperation of Internet of things, Semantic Web and Web 2.0. The availability of relevant data from sensors on people and their environment and the cooperation of artificial and human intelligence through the network will contribute to support independence of people. Moreover, it is supposed that the quality of the end-users everyday life will improve not only due to the support in crucial activities in the house, but also for the possibility of interaction with the outside world both for practical purposes (e.g. ecommerce, e-government, etc.) and for socializing. The idea will be tested with pilots in three countries addressing a basic need of people, i.e. feeding. Pilots will be carried out in Italy, Romania and Netherlands, in order to compare its impact in different social environments.

## **GoldUI**

### **Adaptive Embedded Human Interfaces designed for older people**

Budget: €1.537.726,76      Starting Date: July 18, 2011      Duration: 24 Months

A key concept to GoldUI is the development and maintenance of a cloud-based secure user profile, which is intended to be maintained by a trusted relative or carer. The profile indicates the user's language, eyesight, hearing, mobility and memory capabilities and communication preferences as well as account information for key services via a series of plugins. The key technological innovations that we want to introduce to enable GoldUI project are related to 1) Representation of multimedia content description, 2) Personalization and contextualization of information, 3) Interactive search and agent interfaces able to mitigate complex tasks, bring expertise to the user, and provide more natural interaction; and 4) Human-Computer Interfaces. All these technologies will be employed in an integrating way; this means that, different prototypes will be available along all the phases of the project that will incrementally include the different features and technologies according to the end- users specifications and feedback. There will be pilot trials during 12 months.

## **HOST**

### **Smart technologies for self-service to seniors in social housing**

Budget: €4.774.086,57      Starting Date: May 1, 2011      Duration: 30 Months

The partners of the project will develop a digital infrastructure of the social housing and a gateway to their services. Within the project, the proposed idea is (i) to raise awareness of independent control among older consumers in selecting their own appropriate responses to requirements for a self-serve solution system; (ii) to improve the life of the elderly living in the current social house park, by developing the digital infrastructure of the social housing and giving a better access to their services; (iii) to provide the elderly in social housing with a large panel of ICT services and ease communication with and between their service providers and the "circle of support" composed of the family and local services, both public and private.

## **InclusionSociety**

### **Improving usability of the municipal health services and opening up access to the self-serve society**

Budget: €1.583.790 Starting Date: March 1, 2011 Duration: 24 Months

InclusionSociety provides a preventive health solution for senior citizens at home & in institutions by providing a management portal with an overview of Service Users condition and data collected by medical & “smart home” sensors. The care manager on duty can focus on preventive health principals through knowing where to act. The solution consists of: The homePad – a user friendly intuitive touch screen tablet; The friends & family portal - facilitating easy communication & remote care between Service Users & their families; And the nursePad - designed with high usability & EMR function for nurses visiting senior citizens at home or in institutions. The Care Management System is for Service Providers or Municipal Health Services & gives the central care office an up-dated overview of those at home through an alerts system as well alarm warnings in emergency situations.

## **LILY**

### **Advanced Support for Independent Living; Human Life Cycle Approach in Senior Housing**

Budget: €1.937.854 Starting Date: December 1, 2011 Duration: 36 Months

Lily project focuses on wellbeing services for self-serve supporting environment according to third age people needs from the viewpoint of ICT and taking account the whole human life-cycle. The basic target group is 55+ aged people and the other target groups considered are health and social care giving personnel, local authorities, family members, relatives and friends, service providers, content suppliers, retailers and merchandisers. Lily solutions will be developed using industry-adopted and emerging technologies such as web 3.0 standards, including web services and semantic technologies, video technologies, touch-screens and a variety of end-user devices and interfaces. Co-operational models will be bases for creating value network’s business models. Lily solutions will be developed on a base on three existing systems and piloted in two real living environments. For the new user interfaces the project will pilot sensory environments using printed electronics.

## **MobileSage**

### **Situated Adapted Guidance for the Mobile Elderly**

Budget: €2.398.645 Starting Date: July 7, 2011 Duration: 30 Months

Elderly will increasingly look for useful, user friendly and personalized ICT services that add value to their active and mobile life and that can help them to stay active despite various impairments. Users are involved throughout the process. User requirements have been elicited from three countries, Norway, Spain and Romania, Two innovative services are provided for the advancements of older people’s independence and mobility in the daily life, including in particular transportation and travel.

The means is instantiated by a personal agent on the smartphone, which provides a help-on-demand service.

This service offers relevant, accessible, and usable content upon request, in the form of multimodal and personalized instruction and guidance, enabling people to help themselves. The main target group of the MobileSage service is elderly persons with or without disabilities (motor, perception, cognition), MobileSage also enables and promotes the users’

own generation of such help providing accessible and usable content.

## **Mylife**

### **Multimedia technology for independence and participation for people with dementia**

Budget: €1.059.973 Starting Date: April 1, 2011 Duration: 20 Months

The primary end-users of the Mylife service are older persons with reduced cognitive abilities, and the secondary end-users are formal or informal caregivers. The service-model in the targeted areas of the Mylife project is based on the concept of software as a service, i.e., software that is freely available over the internet and is deployed to run on a smartphone with touch-screen.

The Mylife project includes:

- Development of a spectre of Mylife functions important for the user's self-serve;
- Development of a Norwegian, English and German version, and adaptation to cultural/legal differences/requirements;
- Development of methodology, including ethical aspects, for trials to evaluate how the service meets the needs of individual primary end- users. User tests (HCI) and field trials (system and service) in three European countries;
- Dissemination and exploitation of the results European-wide.

## **NACODEAL**

### **Natural communication device for assisted living**

Budget: €2.543.314 Starting Date: October 1, 2011 Duration: 30 Months

This system will be an innovative ICT-based solution for the ageing population, well contributing to improve the quality of life, autonomy, skills of this segment while reducing care costs of public healthcare. Even if the primary goal of the project is to create a physical device (hardware), it will also be essential NACODEAL's success to design an appropriate service model which fits the end-user needs. During the unwinding of this project, there will be a deep service model analysis based on the two organizations of end-users involved in the project. The initial services that the device will integrate are:

- "Technology wizard" services: aimed at helping elderly people to increase their participation within the ICT society (based on the LibreGeo- Social framework online shopping and social communication services will be implemented)
- "Independent life" services: augmented reality guides aimed at supporting the elders during daily activities

## **SAAPHO**

### **Secure Active Aging: Participation and Health for the Old People**

Budget: €3.072.388 Starting Date: July 1, 2011 Duration: 36 Months

The ultimate goal of SAAPHO is the self-serve, independence and dignity enhancement of seniors through innovative ICT-based solutions. In order to effectively design and apply these tools, SAAPHO will be implemented within a truly user-centred design process in which the three axes of Active Ageing are represented: healthcare with self-care devices, participation in easy-to-use communication and security in the home environment. All these services are seen as gateways connected to the Saapho AAL middleware which mediates with the user interface

application to eventually provide these services to the user. The Saapho middleware a part from orchestrate all these communications, additionally is in charge of providing to the user application personalised interface adaptations, enhancing the usability of this application. Three aspects are foreseen in the scope of SAAPHO to mitigate the easiness of use along with accessibility, deploy ability into an existing life ambient. Firstly, a tactile screen, which is a more intuitive form of interaction, as the central user interface to access to all functionalities. Secondly, a portable system that will provide the envisaged services to the user by means of a NFC (Near Field Communication) enabled mobile phone and NFC reader connected to a PC, laptop and similar. Thirdly, the deployment of inconspicuous sensors for health and security services, which by assisting and not impeding the user will be highly accepted.

## **SOCIALIZE**

### **Service Oriented Assisted Living InfrastructurE**

Budget: € 3.847.772,4      Starting Date: May 1, 2012      Duration: 36 Months

The project SOCIALIZE develops itself in three technologic macro areas to implement:

1. a service-oriented software architecture to supply network services with cloud computing modalities,
2. a set of user interfaces and access devices (with a particular focus on mobile devices) to optimize the experience of using the services that are available in the network for first level end-users (elderly people)
3. a set of software tools to implement services. The tools will be available to social organizations, which will enable them to implement and provide their services through the SOCIALIZE platform.

The SOCIALIZE platform will offer information and entertainment content geared to the needs and interests of elderly people, content which will be provided in a barrier-free and user friendly way tailored to this age group and across the different SOCIALIZE devices.

## **STIMULATE**

### **Sustainable E2 Mobility services for elderly persons**

Budget: €1.748.019      Starting Date: September 1, 2011      Duration: 24 Months

Using a user-centred design methodology, STIMULATE will enable seniors to specify their assistance needs, to extensively plan a trip, to optimize the transport means and itineraries, to secure advice, to be provided with personal assistance while on the move, as well as to secure local shopping recommendations and assistance. Advanced user communication technologies will be used for interactions, namely adapted graphical representations and navigation using common place terminals (PC, mobile phones and tablets), as well as multimodal natural / seamless expression. Advanced knowledge based GIS technologies will be used for processing and personalizing seniors travel and shopping requests, optimizing transport itineraries, providing travel assistance, securing health care support, and enacting the overall execution of the planned travel and shopping. For ease of use all the services offered by the “STIMULATE” platform will be accessible via web browsing, for PC, tablets and mobile phones through the use of the W3C approved HTML5 standard. As a part of the end- user involvement strategy, user groups will be defined, selected and recruited according to a well-defined profile which will be acted in early steps of the project. This plan considers: sampling requirements, ethical regulations and several strengths of different user and stakeholder groups which are located in different cities. Older people without any significant cognitive impairment will be the main user group of the project. The aim of the involvement procedure is to cover all the common characteristics associated with that age relevant to travel and

shopping activities of older people.

## **vAssist**

### **Voice Controlled Assistive Care and Communication Services for the Home**

Budget: €2.345.104 Starting Date: December 1, 2011 Duration: 36 Months

The goal of vAssist is to provide specific voice controlled Home Care and Communication Services for older persons. The consortium considers user, technical and economic constraints in a sound methodological setup. A User Centred Market Oriented Design process (UCMOD) involves end users in all phases of the development process considering market aspects from the initial project phase. This procedure assures that the iteratively developed service and business model(s) are adapted to the requirements and needs of older persons showing a high market potential within the next 2-3 years. In the requirement phase focus groups in three different countries (AT, FR, IT) will involve seniors, family members and health professionals. Further, iterative lab and field trials will focus on the evaluation of the developed solution together with all actors focusing on usability, accessibility, user experience and acceptance of the vAssist system.

## **WayFis**

### **Way Finding Seniors**

Budget: €1.540.410 Starting Date: March 1, 2011 Duration: 30 Months

TWayFiS is a personalized way finding service for elderly people (considering both public transport and paths by foot) focused on the objective of making the elderly feel healthy-well and safe (not technology centred) and that takes into account their specific limitations and healthy habits, WayFiS is based on the existence of a wide range of personalization features, building up user profiles, and that include the health state of the person and his common behaviours and needs. ; it will include a localization and positioning feature as well for both indoor and outdoor environments that will guide the elderly along complex paths. WayFis technology methodology will be based in the creation of a route planning gadget friendly for the elderly combined with a personalization route mechanism based on user's common and daily behaviours, healthy habits and elderly limitations.

### 2.3.2 Summary table (projects AAL Call 3)

Project	Starting date Duration	Total budget	D/E	Topic	Target	Technology	M€
<b>2PCS</b> Personal Protection and Caring System	July 1, 2011 24 Months	€ 1.741.213	E	Safe mobility; Socialize		Special Device; Web-based social network	€1,5
<b>AALuis</b> Ambient Assisted Living user interfaces	July 1, 2011 36 Months	€ 3.238.624	E	Daily hep	User interfaces	Special devices	€3,0
<b>ALFA</b> Active Living For Alzheimer-patients	January 1, 2012 24 Months	€ 2.162.987	D	Daily help; Safe mobility; Heath	Alzheimer	Health sensors; Special devices	€2,0
<b>AMCO</b> Ambient Concierge	November 1, 2011 36 Months	€ 2.620.726	E	Daily help; Socialize		Special devices; Web-based social network	€2,5
<b>BANK4ELDER</b> Innovate ways of banking designed for and by the ederly	October 1, 2011 36 Months	€ 1.723.108	E	Daily help	Bank access using web, TV, ATM	Special devices	€1,5
<b>Care@Home</b> CARE services advancing the social interaction, health wellness and well-being of elderly people AT HOME	November 21, 2011 36 Months	€ 3.907.881	E	Wellbeing		Special devices	€4,0
<b>ELDERHOP</b> Solution Assisting the Shop Hopping of Elderly	September 1, 2011 24 Months	€ 1.777.488	E	Daily help	Shopping	Special devices	€2,0
<b>ENTRANCE</b> Enabling Elderly People travel and Internet Access	September 1, 2011 36 Months	€ 4.385.128	E	Safe mobility		Special devices	€4,5
<b>FEARLESS</b> Fear Elimination As Resolution for Loosing Elderly's Substantial Sorrows	July 1, 2011 36 Months	€ 2.700.000	E	Daily help	Vision and acoustic event detection	Special devices	€2,5
<b>FOOD</b> Framework for Optimizing the prOcess of FeeDing	September 1, 2012 36 Months	€ 3.232.865	E	Daily help	Kitchen applications	Special devices	€3,0

<b>GoldUI</b> Adaptive Embedded HumanHI-Iberia Ingeniería y Proyectos S.L. Interfaces designed for older people	July 18, 2011 24 Months	€ 1.537.726	E	Daily help	User interfaces	Special devices	€1,5
<b>HOST</b> Smart technologies for self-service to seniors in social housing	May 1, 2011 30 Months	€ 4.774.086	E	Daily help		Special devices	€5,0
<b>InclusionSociety</b> Improving usability of the municipal health services and opening up access to the self-serve society	March 1, 2011 24 Months	€ 1.583.790	E	Socialize; Health; Wellbeing		Special devices	€1,5
<b>LILY</b> Advanced Support for Independent Living; Human Life Cycle Approach in Senior Housing	December 1, 2011 36 Months	€ 1.937.854	E	Daily help		Special devices	€2,0
<b>MobileSage</b> Situated Adapted Guidance for the Mobile Elderly	July 7, 2011 30 Months	€ 2.398.645	E	Safe mobility	E.g. automated ticketing machines.	Special devices	€2,5
<b>Mylife</b> Multimedia technology for independence and participation for people with dementia	April 1, 2011 20 Months	€ 1.059.973	E	Daily help	MCI / Dementia	Special devices	€1,0
<b>NACODEAL</b> Natural communication device for assisted living	October 1, 2011 30 Months	€ 2.543.314	E	Daily help		Augmented Reality	€2,5
<b>SAAPHO</b> Secure Active Aging: Participation and Health for the Old People	July 1, 2011 36 Months	€ 3.072.388	E	Daily help		Special devices	€3,0
<b>SOCIALIZE</b> Service Oriented Assisted Living Infrastructure	May 1, 2012 36 Months	€ 3.847.772		Socialize		Web based social network	€4,0

<b>STIMULATE</b> Sustainable E2 Mobility services for elderly persons	September 1, 2011 24 Months	€ 1.748.019	E	Safe mobility		Special devices	€1,5
<b>vAssist</b> Voice Controlled Assistive Care and Communication Services for the Home	December 1, 2011 36 Months	€ 2.345.104	E	Health	Chronic diseases and motor problems	Special devices	€2,5
<b>WayFis</b> Way Finding Seniors	March 1, 2011 30 Months	€ 1.540.410	E	Safe mobility		Special devices	€1,5

*Table 2.3.2-1: Summary table of AAL call3 projects*

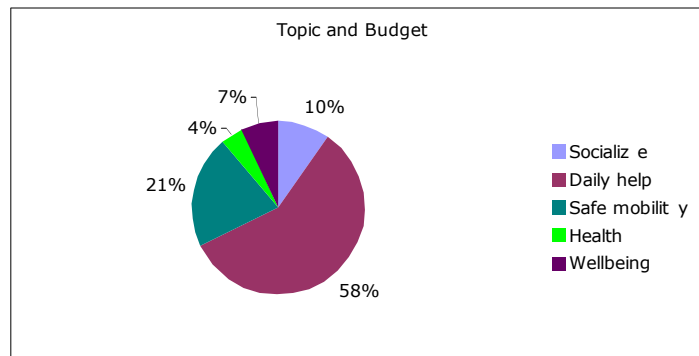


### 2.3.3 Considerations

This call was characterized by research on the "Daily help". In fact, 13 out of 22 projects have dealt with this topic. The mean cost of each project was €2.539.959,33

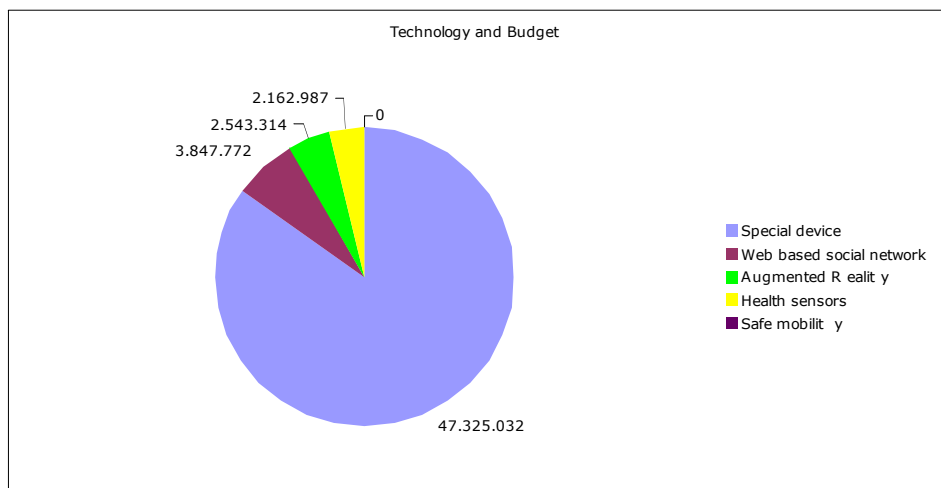
Topic	Budget	N°
Socialize	5.431.562	2
Daily help	32.381.142	13
Safe mobility	11.813.415	5
Health	2.345.104	1
Wellbeing	3.907.881	1
	55.879.105	22

Table 2.3.3-1: Budget subdivided for topic



Graphic 2.3.3-1: Topic and budget

The technology that has prevailed in this call was "Special devices".



Graphic 2.3.3-2: Technology budget (AAL call 3)

Technology	Budget	N°
Special devices	47.325.032	19
Web based social network	3.847.772	1
Augmented Reality	2.543.314	1
Health sensors	2.162.987	1
	55.879.105	22

Table 2.3.3-2: Technology and budget (AAL call 3)

## **2.4 AAL projects call 4**

### **2.4.1 Short abstracts**

#### **AIB**

##### **Ageing in Balance**

Budget: €1.478.093 Starting Date: March 1, 2012 Duration: 36 Months

The aim of Ageing in Balance (AiB) project is to develop a new solution for preventing the falls of the older adults, by taking into account wide range of different factors. In AiB, an innovative model of risks of falls will be developed. The model will include all possible risk factors as described by the various studies and assessments from all aspects (mental, physical and environmental: intrinsic and extrinsic). Several assessment scales combined with data from environmental sensors and other technology (e.g. cognitive games) will be employed to give a clear picture of the fall risk. Another goal of the AiB is to develop technologies for early prevention of falls of older people in their homes by providing motivation that will lead to changing behaviour. The expected impact will be the maintenance of a better physical, neurological and mental condition by the end user that will decrease the risk of falling. Additionally, fall risks can be reduced by identifying potential environmental risk factors and eliminating them. Preventing the majority of falls would save a lot of money and improve and prolong the good quality of life of ageing adults. The project will also survey the willingness to pay point of view as well as to better define the costs and effects. User involvement is crucial in this project. Users from Spain and Finland will be engaged in the specification, development and testing phases so that the development can be based on their feedback as well. See more at: [www.aal-europe.eu/projects/aib/#sthash.5tzz02Un.dpuf](http://www.aal-europe.eu/projects/aib/#sthash.5tzz02Un.dpuf)

#### **ALICE**

##### **Assistance for Better Mobility and Improved Cognition of Elderly Blind and Visually Impaired**

Budget: €1.797.253 Starting Date: June 1, 2012 Duration: 30 Months

Assistive device Alice will consist of smartphone wirelessly connected to local or in perspective remote processing unit. Apart from the camera, Alice will utilise sensors for position detection, orientation, movement and distance from obstacles. The position and distance mapping will be cross-referenced and processed in combination with the visual information, avoiding ambiguities in the semantics. Alice will use artificial intelligence to plan and anticipate based on fusion of sensory inputs and previous knowledge. The system will verbalize its perceptions through intuitive audio system and synthesised voice to translate visual to verbal in comprehensive and user friendly manner. The user will be able to communicate with the system through a voice interface. Principal end users are elderly blind who will be involved in each iteration of ALICE development by providing suggestions and guiding the change of requirements according to their experiences. Other users of the system are relatives and carers who will set-up and share routes for navigation leading to the development of a respective community.

#### **ALMA**

##### **Assistants for Safe Mobility**

Budget: €2.997.526 Starting Date: April 2, 2013 Duration: 36 Months

ALMA aims to support the autonomous mobility, navigation, and orientation of the mobility-impaired person (elderly and/or temporarily or permanently disabled person) through the realization and combination of a set of advanced hw/sw technologies into an integrated and modular cost-effective system composed by:

1. an indoor localization system based on a network of low-cost/low-power RF emitters, to provide room level localization of people and objects;
2. an ad-hoc, autonomic hw/swsystem based on networked smart cameras providing accurate indoor and outdoor localization, environment monitoring, and situation assessment;
3. a system for online planning and scheduling of users' paths and activities, matching users' specific needs with the state of the environment and of resources;
4. a Personal Mobility Kit for electric powered wheelchairs, allowing them to perform automatic or assisted navigation and to interact with the surrounding environment;
5. a Personal Navigation Assistant, providing a user-friendly interface to all ALMA functionalities, tailored to the specific user requirements and physical limitations. Two pilot applications, presenting different scenarios and therapeutic issues for both primary (elderly, rehabilitation patients) and secondary (care givers) end-users will guide project development.

They will also provide on-field assessment of the produced technology, both as a fully integrated system and as a subset of interacting modules.

## **ASSAM**

### **Assistants for Safe Mobility**

Budget: €2.979.164 Starting Date: June 1, 2012 Duration: 36 Months

For non-electric platforms, the Navigation Aid comprises odometry hardware in cooperation with a smartphone or tablet computer with GPS that interacts with Open Street Maps for precise navigation. Simple dialogues allow natural language interaction. Using additional laser-range sensors, the Driving Aid enhances the safety by recognising and warning for steps and obstacles, also enabling indoor navigation. For electrically powered platforms, the Navigation Assistant proactively corrects the driving direction, steering and braking accordingly. Fully autonomous driving will be supported in charted indoor environments. The care centre connection is activated manually, or automatically in case of a fall or crash, and permits the caregiver to visually inspect the situation when authorised by the user. End-users will be involved from the beginning in the design and evaluation of the mobility assistants for everyday usability. The iterative schedule implies two refinement phases, where the initial prototypes will be adapted according to the users' feedback.

## **ASSISTANT**

### **Aiding SuStainable Independent Senior TrAvellers to Navigate in Towns**

Budget: €2.666.015 Starting Date: June 1, 2012 Duration: 36 Months

Enabling older users to confidently and safely use public transport, and providing a safety net when route mishaps happen, is the goal of the ASSISTANT project. The main target group of ASSISTANT is mobile older people, particularly when they are travelling to novel places or beginning to use public transport, or after stopping driving. The system will be developed with primary end-users' involvement and iteratively evaluated with three different public transport systems in Vienna, San Sebastian and Paris. Both the concepts and the low fi

prototypes will be re-designed after each feedback cycle until the product achieves the defined goals from end-users' perspective. Key to ASSISTANT's simple success is the use of well-tested and robust technologies, (i.e. the PC, smart phone and GPS), combined with customisable user interfaces and consideration of unexpected events and their consequences. The ASSISTANT product will be ready to market after completion of the project.

## **COM'ON**

### **Confident Motion**

Budget: €2.698.711 Starting Date: March 1, 2012 Duration: 28 Months

COM'ON addresses the perceived orientation/navigation challenges and special needs that older persons experience throughout the whole chain of travel, using public transportation. COM'ON will exploit the assistive capability of smartphones by addressing dual-task coping issues that older persons face when managing information and navigation in public sphere. On the move interfaces will be designed to reflect the physical and mental resources of the older persons in accordance with universal design principles. A key success parameter will be careful flawless integration and design of already existing technologies and services, guided by a deep understanding of end-users' needs and wishes, provided by innovative ethnography, cocreation and real life tests.

## **CONFIDENCE**

### **Mobility Safeguarding Assistance Service with Community Functionality for People with Dementia**

Budget: €2.820.158 Starting Date: June 1, 2012 Duration: 36 Months

CONFIDENCE offers a location-augmented voice channel (care persons are able to assist lost patients with voice instructions in order to bring them back to well-known places), a virtual video channel (clients are able to see a trusted care person for creating a sense of confidence and security), a location tracking service (with the client's consent the person can be automatically tracked on an electronic map while being on the move), and finally, a mobile care service (allowing care persons to be mobile themselves while instructing their clients). To keep service costs low, a credits system based on emerging mobile payment technologies will be established. To ensure a high acceptance of CONFIDENCE, end users (people with dementia, family members, professionals from home care agencies and trusted volunteers) will be involved in all phases of the projects.

## **DOSSy**

### **Digital Outdoor And Safety System**

Budget: €1.568.577 Starting Date: August 1, 2012 Duration: 24 Months

Supporting outdoor activities is a fast growing and important field in the area of software and hardware development. Taking into account, that outdoor activities become a more and more important part of the lives of elderly people it stands for a self-determined life to be able to practise outdoor activities irrespective of one's age and constitution. Furthermore, outdoor activities contribute largely to the health and wellbeing of the elderly and improve their quality of life. A commercial roll out of the system can contribute to a better health, enabling elderly people to keep up their mobility. The frontend solution will be evaluated by end-users during the development process using an appropriate mobile device and an app to improve its usability by receiving consumer feedback

## **E-MOSION**

### **Elderly friendly MObility Services for Indoor and Outdoor sceNarios**

Budget: 2.413.672 Starting Date: July 1, 2012 Duration: 30 Months

The solution will be based on a combination of existing and future open mobile platforms, an IP connected server platform and a home security sensor network. Applications for these will be developed and customized. Furthermore, an accessory portable easy-wearable device will allow easy control the main functionalities of the service to interface with the mobile phone. The development and analysis of applications consists of two parts: the identification of services and features to be exploited and / or offer and the development of a user friendly graphic interface. This methodology allows the exploitation of services developed by applications from other platforms by eliminating duplication and ensuring interoperability, scalability and easy development of new features. EMOSION will involve users extensively in the requirements analysis, the usability engineering and evaluation tasks. Involvement of the end users means to investigate users' needs and wishes addressed to the project objectives.

## **E-Stockings**

### **New generation smart compression stockings with integrated ICT for superior customized performance**

Budget: 1.934.259 Starting Date: February 1, 2012 Duration: 36 Months

The project implementation is based on an iterative strategy. A first phase is dedicated to the development of a pre-prototype with the basic functionalities. After testing and evaluation of the performance of the pre-prototype, the results will be used to guide a second phase of development, which will deliver the final prototype. The implementation of the project will be based on a user-entered approach. As such, end-users are engaged at all stages of the project development and are invited to work closely with the RTD Performers and the company partners to reach a simple, intuitive and appealing final solution that reflects user needs and expectations. Depending on the success of the pre-prototype version, the second phase of development will either be dedicated to (1) fine tuning of the basic functionalities and incorporation of additional features envisaged for the advanced version of the technology, or (2) wide re-design of the basic functionalities to implement contingency approaches and achieve the success criteria for the compression solution.

## **EXO-LEGS**

### **Elderly friendly MObility Services for Indoor and Outdoor sceNarios**

Budget: 4.559.117 Starting Date: October 1, 2012 Duration: 36 Months

The overall work plan is organised in 6 work packages which comprise the following: 1) WP1 (End users and scenarios): Setting up and managing a stakeholder pool with ethical considerations so the mobility requirements of elderly persons can be determined and the resulting exoskeletons tested by real end users; 2) WP2 (Exoskeleton components): Theoretical studies of the systems needed, realisation of exoskeleton components comprising mechanical parts, sensors & controls, user interfaces, etc; 3) WP3 (System integration, testing and validation): Configuration of the components developed to realise Basic, Standard, and Deluxe exoskeletons, and testing by researchers in laboratories; 4) WP4 (Pilot test beds): User testing by elderly persons in Sweden, Germany, Spain, Switzerland, and UK; 5) WP5 (Commercialisation): Development of business and service models for implementation in different regions of the EU, and dissemination of the project results, and 6) WP6 (Project

management): Overall work plan management and administration, finance, reporting, quality assurance, etc.

## **GameUp**

### **Game-based mobility training and motivation of senior citizens**

Budget: 2.226.345 Starting Date: April 1, 2012 Duration: 36 Months

The project will develop a platform for social and exercise games that shall motivate elderly to exercise more and correctly. Game-based technologies and persuasive technologies will be used to motivate the elderly to perform good exercises. Experiences from elderly playing existing exergames (like Wii and Kinect) will be used in combination with the combined knowledge in the project about needs and limitations for our target group. Exercise games shall be playable from home, and shall have social elements that motivate the elderly to play and exercise together. Existing input technologies (remotes, cameras etc.) will be used – and adapted if needed. Users in all three countries will be involved in all stages in the project. In the beginning they will participate in focus groups where they will try out existing technologies, and discuss what they like, what is difficult, what they would like, etc. Later they will be invited to test preliminary results regularly to direct the course of the project. All participation is voluntary.

## **Guiding Light**

### **Ambient Light Guiding System for the Mobility Support of Elderly People**

Budget: Unknown Starting Date: May 1, 2012 Duration: 36 Month

Light is used to meet visual needs of human (e.g. highlighting risks of falling), is applied for temporal orientation throughout the day (e.g. emphasizing day-night rhythm), for spatial navigation during activities of daily living (e.g. illumination of a defined location areas) and is used as remembering as well as information signal (e.g. light spots and light signals). Light therefore has great potential for attenuation of age-related mobility impairments caused by reduced spatio-temporal orientation, worry about getting lost, and fear of falling. To make use of light in this sense, we will implement a light way guidance system in private homes of older people that performs a time- and motion- controlled change of intensity and colour temperature of room lightings. We will use existing lightings in these rooms and supplement them with additional lighting equipment and electrical installation technologies. After modification light characteristics of lamps will change automatically according to the personal daily routine of residents. This, however, will not be a rigid system. At the same time mobility parameters of the residents will be monitored (such as movements in and outside the home) and the results of analysing these data will be used to change the programming of light variations. The adjustment of light programming will be done automatically, nevertheless, residents can manually readjust their lights at any time. The degree of mobility is an important indicator of health. For this reason we will integrate relevant parameters into a distributed information system as the basis for decisions about preventive provisions. This will give residents at any time insight into their health status, which can be shared with persons of trust (e.g. relatives, doctor).

## **Happy Walker**

### **ICT-based solution to help elderly mobility**

Budget: €3.028.000 Starting Date: September 1, 2012 Duration: 36 Months

Until now, the technical solutions to support the older adults in their mobility do not address

their needs, wishes and capacities. The innovation in this project consists of the development of an easily accessible and affordable platform facilitating a consistent, intuitive and personalized and contextualized set of mobility enhancement services e.g. outdoor monitoring and safety, travel planning and support, self-management and life-style. Personalization refers to both (current) characteristics of the user (profiling) e.g. physical condition, preferences, motivation and (current) characteristics of the direct surroundings e.g. living accommodation, neighbourhood and further range of aims and actions of the user e.g. visiting family, public transport. These services should be provided in an unobtrusive way, integrated in typically used assistive technology, and/or other objects, which are daily used by the older adult (i.e. wrist watches or bikes).

## **iWalkActive**

### **The Active Walker for Active People**

Budget: €2.827.000    Starting Date: August 15, 2012    Duration: 36 Month

Active living is a way of life that integrates physical activity into daily routines. However, a large proportion of the age group 60-85 suffers from various kinds of physical disability that prevents them from living actively. Rollators may help but one of their main problems is that people in actual need of walking support often hesitate or refuse to use these walking aids as they are heavily stigmatized. In iWalkActive the user will be provided with an active, desirable walker providing cloud services and a drive based on brushless DC-motors. The user interacts with the active walker by a smartphone or a tablet PC using the touch screen, microphone and speaker. The services make use of indoor and outdoor navigation and include e.g. proposals for walking routes, or navigation to the examining room in a hospital. The sensors of the smart device will be used, e.g. for navigation or image processing. The novel active walker will be thoroughly tested by four different user groups in three European Countries (AT , CH, SE) in both urban areas and the outdoors.

## **ICITYFORALL**

Budget: €5.082.399    Starting Date: July 1, 2012    Duration: 36 Months

The goal of I'CityforAll is to design "Audio Aged sensitive" ICT systems enhancing self-confidence, mobility, safety, for a better social and mental (overall) wellbeing. The targeted population corresponds to people older than 50 years in mobility situations and affected by presbycusis that induces a loss of sense of safety and self-confidence. Affected Security and Mobility due to altered sound perception of elderly is observed in two main situations:

- Mobility in confined public spaces such as transport stations, airports, supermarkets, museums, etc...where altered audio/speech and verbal communication perception has serious impact on emotional, physical and social well-being.
- Urban Mobility where the elderly are involved in 40% of fatal injuries (105,000 deaths/year), and 1500 accidents/day require medical assistance according to the European Network for Safety.

Therefore two Audio Aged Sensitive ICT innovations will be designed:

- [I'CityLoudSpeaker]: smart loud speakers for better intelligibility in confined public spaces such as railway stations, airports, museums and during car driving.
- [I'CityAlarm]: Embedded system in vehicles for automatic outdoor alarm localization and indoor alarm enhancement.

These systems will be “transparent” and embedded in mass products for people with presbycusic hearing without impacting normal hearing people, in the “Design for All” approach. The I’CityForAll innovations will be tested by using the analysis software developed by the CENTICH and involving 90 users of the targeted population which will be compared to a normal group of population. The results of this assessment will form the basis of a labelling procedure that can be extended to other technological solutions.

## **IMAGO**

### **A navigation and positioning technology for the blind and visual impaired**

Budget: €1.267.571 Starting Date: September 1. 2012 Duration: 36 month

In Europe 0.9 Million people are blind and 12 Million are visually impaired. Global the numbers are over 160 million. Over 60% of the blind and visual impaired in Europe are now 60 years of age or older. The WHO expects further growth of 30-50% within next 10-15 years related to ageing and diabetes. Despite all new technologies mobility for visually impaired still relies on remembering routes and using a long cane. Travelling outside a limited comfort zone requires help from others. Unnecessary economic and civil isolation is a consequence. High accuracy mobility is a clear unmet need. Today satellite receivers have the size of a coin. However high accuracy positioning is still lacking due to quality and availability of satellite signals. The future of satellite navigation offers no solution in for the next decades. The IMAGO project will deliver a new positioning method filling the satellite gap for pedestrian navigation. This method will be based on video processing, comparing pre-walked and geo-tagged route movie frames to the current recorded scene. An image-based positioning and navigation system will be implemented at the functional prototype level and validated with users. The IMAGO consortium connects partners with specific technological and application domain knowledge. Users from the Netherlands, Germany and Belgium will be involved in the IMAGO project. Users will validate the systems during the various stages of development.

## **MOBECS**

### **A Non-stigmatizing (MOB)ility and (E)mergency (C)all (S)ystem Ensuring A Safe Outdoor Mobility Chain**

Budget: €3.132.431 Starting Date: July 1, 2012 Duration: 36 Months

The MOBECS consortium is formed by a research institution, a communication service provider, hard- and software manufactures and end user organizations. The target focus group is formed by elderly people. Subgroup 1 is formed by elderly people who live independently in their homes. Subgroup 2 lives in (part-time) assisted living environments. Members of subgroup 3 al- ready live in a retirement home or suffer from either cognitive or physical impairments. We address all subgroups, each characterized by its own needs and degrees of mobility, by a modular service and system architecture. We incorporate automatic emergency detection methods by using sensors (such as accelerometers, gyro meters, microphones, GPS modules, cameras) built in wearable technology, clothing and mobile devices. The proposed system can be accessed via a barrier-free human-machine interface to account for age and health-related impairments, which will lead to a maximum on end-user acceptance and operability.

## **Mobile.old**

### **A Pervasive Guardian for Elderly with Mild Cognitive Impairments**



Budget: € 1.471.220 Starting Date: June 1, 2012 Duration: 36 Months)

MOBILE.OLD uses an Internet-enabled TV and/or a Set-Top-Box solution, which will be the main user interface for the older persons, providing multimodal web-based user interfaces using the remote control for service navigation and advanced Text-To-Speech (TTS) solutions for audio announcements. Also a smartphone-solution using Android operating system, allowing on one hand for accessing the MOBILE.OLD services outside the home environment and on the other hand for offering advanced geo-fencing services will be used. The MOBILE.OLD consortium includes four partners who ensure the direct involvement of Austrian, Dutch, Spanish and Romanian elderly users throughout the project lifetime, including requirements collection phase of the projects, as well as the pilot trial activities that will take place at least twice during the project. The MOBILE.OLD services will be offered through the TV-Set over the public Internet or a smartphone by accessing the MOBILE.OLD Application Server.

## **MyGuardian**

### **A Pervasive Guardian for Elderly with Mild Cognitive Impairments**

Budget: € 2.287.932 Starting Date: May 1, 2012 Duration: 36 Months

MyGuardian will provide the following technologies: easy-to-use and rich communication between the mobile senior and the caregivers in order to reassure both caregivers and the senior thanks to the enrichment of communication messages with contextual data on senior's psychological state; remote tracking and assistance that will enable the monitoring of senior physiological state and behaviour in order to detect risk situations and appropriate, personalized intervention, escalating depending on the assessed criticality of the situation; coordination between caregivers that will improve awareness within the group of caregivers, and enable them smooth distribution and delegation of care tasks. Three end-users organizations of Spain, France and The Netherlands. End-user organizations in these three countries will be involved that will provide access to approximately 30-50 seniors with mild cognitive impairments together with their voluntary caregivers and possibly also professional caregivers (e.g., their social nurses).

## **NavMem**

### **Navigation Support for Older Travellers with Memory Decline**

Budget: € 1.980.000 Starting Date: October 1, 2012 Duration: 36 Months

The NavMem system is targeted at elderly travellers, but will include a number of features targeted specifically at MCI users. The main scenario focuses on supporting people when visiting unfamiliar environments, such as travelling within unknown areas of a city. The navigation companion provides three different modes: (1) Background mode: the system provides coarse multimodal spatial cues, such as direction and distance to the next intermediate goal, such as a bus stop. Users try to find their own routes, which will stimulate their spatio-cognitive abilities. (2) Navigation mode: the system will provide detailed navigation instructions that are tied to landmarks. (3) Safety line: In case the user is not able to overcome disorientation, the system can temporarily share the user's location on demand to (informal) care givers to get personal support. Following the human-centred design process, end users and all stakeholders will be involved throughout all stages of the development.

## **SafeMove**

### **Safe mobility of elderly in the vicinity of their home and on Journeys**

Budget: € 2.169.940 Starting Date: July 1, 2012 Duration: 36 Months

The solution will be designed and developed as an operational infrastructure suitable to provide all the requested functionalities to enhance the quality of life of elderly people and improve their mobility.

The operational infrastructure will be designed according to the abstract SOA model and the implementation of prototypes and final system will be carried out by using self-standing components for the hardware platform and web-services and related technologies for the software architecture. This technological choice will allow for a high flexibility and reusability of software and hardware components, concurrent development, and easy management of both the development process and the communication. The operational infrastructure will be the “glue” that will allow the proper and smooth functioning of the relevant technical modules in the solution: motivational and creative games engine, location/navigation personalised tools, Web2.0 tools for social inclusion and communication, multimodal interaction, communication infrastructure.

## **T&Tnet**

### **Travel & Transport solutions through emotional-social NETWORKING**

Budget: € 3.170.229 Starting Date: July 1, 2012 Duration: 36 Months

Technologically speaking, T&Tnet will make use of a Multimodal travel and transport infrastructure (dealing with network object modelling, label correcting techniques and metaheuristic algorithms to find the shortest viable path from an origin to a destination), System intelligence and artificial reasoning (multimodal behaviour measurement, reasoning and control system (RT- MMC)), Mobile applications (iOS and Android) and a GIS social platform. The T&Tnet project will use a user- entered approach that involves directly end-users throughout the development lifecycle. Three basic principles of this approach will be followed: (a) an early focus on users and their needs, (b) evaluation and measurement of product usage, and (c) iterated design. End-users organizations (FR, SN, ZGZ) will use a variety of techniques and methods to take into account the user’s experience for the design of the product features

## **TMM**

### **The MobilityMotivator**

Budget: € 4.026.476 Starting Date: June 1, 2012 Duration: 30 Months

MobilityMotivator will integrate a range of state of the art technologies such as a “4D” Contact Point Station, providing accessible, customized and simultaneous verbal and non-verbal communication combined with reading and writing of shared documents, and a Videoconference Goniometer (VCBG), allowing for tele-measures of ranges of motion, into a multi-player GPS navigation gaming environment leveraging La Mosca’s technologies in “City Secrets”, to provide a truly innovative and fun approach to healthy living and ageing. Indeed Dr H (secondary end user) who wants to motivate his older diabetic patient in practising exercise and fighting isolation, will use the 4D Contact station combined with the VCBG, to understand his patient’s needs, to assess his physical and cognitive capabilities, to encourage him to play according to his personal capabilities, and to monitor these over time, communicating with him from his office in the hospital. Dr H will also be able to download

the results achieved in the medical scenarios played by his patient.

## **VIRGILIUS**

### **A Guide to Elders' Well Being**

Budget: € 3.212.863 Starting Date: June 1, 2012 Duration: 30 Months

VIRGILIUS project will implement a system which will provide services to be tested in the following scenarios: Hospital orientation: Considering the orientation difficulty encountered by the elders person especially in the big Hospital, the Perugia Hospital has shown interest in a system able to provide the necessary elders people support to the movement within the hospital. To this aim, the development of a navigation and guidance application in an indoor complex environment has been taken into account. By means of an easy device to be provided at the Hospital entrance and on which the dedicated personnel loaded the “pre-trip” of the person, the elder person will be able to go around the Hospital Travel support-pedestrian guide: This scenario has been taken into account to answer to the elder person necessity to have a simple and international “guide-device” during their movement around the world. To this aim, the navigation and guidance application in an indoor complex environment developed for the previous scenario will be upgraded with the outdoor navigation functionally in order to provide to the users a device able to support their movements in both cases and in every place of the world, assuring the continuity and affordability of the services. In this case, the system will be able to provide the management and related filtering of the information providing indication and sending location info and/or alarm to the elder’s family In particular, the developed services and products will be used by elders, which travel without family or care giver, in order to benefit of a virtual guide inside the Romanian Museum (ticket office, exits, toilet, a guide to the museum) and, if case, to send alarms to the family. Also, the family can check on a virtual platform the location of the elder.

## 2.4.2 Summary table

<b>Project</b>	<b>Starting date duration</b>	<b>Total budget</b>	<b>D/E</b>	<b>Topic</b>	<b>Target</b>	<b>Technology</b>	<b>M€</b>
<b>AIB</b> Ageing in Balance	March 1, 2012 36 Months	€ 1.478.093	E	Daily help	Preventing the falls	Smart environment	2,8
<b>ALICE</b> Assistance for Better Mobility and Improved Cognition of Elderly Blind and Visually Impaired	June 1, 2012 30 Months	€ 1.797.253	D	Daily help	Navigation assistant	Smart environment / A.I.	1,8
<b>ALMA</b> Assistants for Safe Mobility	April 2, 2013 36 Months	€ 2.997.526	D/E	Daily help	Navigation assistant	Special devices	3,0
<b>ASSAM</b> Assistants for Safe Mobility	June 1, 2012 36 Months	€ 2.979.164	E	Safe Mobility	Navigation assistant	Special devices	3,0
<b>ASSISTANT</b> Aiding SuStainable Independent Senior TrAvellers to Navigate in Towns	June 1, 2012 36 Months	€ 2.666.015	E	Safe Mobility	Navigation assistant for travellers	Special devices	2,7
<b>COM'ON</b> Confident Motion	March 1, 2012 28 Months	€ 2.698.711	E	Safe Mobility	Navigation assistant for travellers	Special devices	2,7

<b>CONFIDENCE</b> Mobility Safeguarding Assistance Service with Community Functionality for People with Dementia	June 1, 2012 36 Months	€ 2.820.158	D	Safe Mobility	Location tracking service	Special devices	2,8
<b>DOSSy</b> Digital Outdoor And Safety System	August 2012 24 Months	€ 1.568.577	E	Safe Mobility	Outdoor activities	Special devices	1,6
<b>E-MOSION</b> Elderly friendly MObility Services for Indoor and Outdoor sceNarios	July 1, 2012 30 Months	€ 2.413.672	E	Safe Mobility	Mobility Indoor/Outdoor	Special devices	2,4
<b>eStockings</b> New generation smart compression stockings with integrated ICT for superior customized performance	February 1, 2012 36 Months	€ 1.934.259	D/E	Unknown		Unknown	2,0
<b>EXO-LEGS</b> Elderly friendly MObility Services for Indoor and Outdoor sceNarios	October 1, 2012 36 Months	€ 4.559.117	E	Safe Mobility	Mobility Indoor/Outdoor	Robot	4,6
<b>GameUp</b> Game-based mobility training and motivation of senior citizens	April 1, 2012 36 Months	€ 2.226.345	E	Wellbeing	Games	Special devices	2,2

<b>Guiding Light</b> Ambient Light Guiding System for the Mobility Support of Elderly People	May 1, 2012 36 Month	Unknown	E	Safe Mobility	Preventing the falls	Smart environment	Unknown
<b>Happy Walker</b> ICT-based solution to help elderly mobility	September 1, 2012 36 Months	€ 3.028.000	E	Safe Mobility	Outdoor activities	Special devices	3,0
<b>iWalkActive</b> The Active Walker for Active People	August 15, 2012 36 Month	€ 2.827.000	D/E	Safe Mobility	Mobility Rollators	Special devices	2,8
<b>ICITYFORALL</b>	July 1, 2012 36 Months	€ 5.082.399	D/E	Safety	Presbycusis	Special devices	5,1
<b>IMAGO</b>	September 1, 2012 36 Month	€ 1.267.571	D/E	Daily help	Visual impairments	Special devices	1,3
<b>MOBECS</b> A Non-stigmatizing (MOB)ility and (E)mergency (C)all (S)ystem Ensuring A Safe Outdoor Mobility Chain	July 1, 2012 36 Months	€ 3.132.431	D/E	Safe Mobility	Mobility	Special devices	3,1
<b>Mobile.oid</b> A Pervasive Guardian for Elderly with Mild Cognitive Impairments	June 1, 2012 24 Months	€ 1.471.220	D	Safe Mobility	MCI	Special devices	1,5
<b>MyGuardian</b> A Pervasive Guardian for Elderly with Mild Cognitive Impairments	May 1, 2012 36 Months	€ 2.287.932	D	Safety	MCI	Web-based social network	2,3

<b>NavMem</b> Navigation Support for Older Travellers with Memory Decline	October 1, 2012 36 Months	€ 1.980.000	D	Safe Mobility	MCI	Web-based social network	2,0
<b>SafeMove</b> Safe mobility of elderly in the vicinity of their home and on Journeys	July 1, 2012 36 Months	€ 2.169.940	E	Safe Mobility	Communication	Web-based social network	2,2
<b>T&amp;Tnet</b> Travel & Transport solutions through emotional-social NETworking	July 1, 2012 30 Months	€ 3.170.229	E	Daily help	Navigation assistant for travellers	Artificial Intelligence	€3,2
<b>TMM</b> The Mobility Motivator	June 1, 2012 36 Months	€ 4.026.476	D/E	Wellbeing	Mobility Motivator	Special devices	€4,0
<b>VIRGILUS</b> A guide to Elders' Well Being	June 1, 2012 30 Months	€ 3.212.863	E	Wellbeing	Navigation assistant	Special devices	€3,2
<b>TOTAL</b>		€ 14.559.328					

Table 2.4.2-1: summary table of AAL call 4 projects

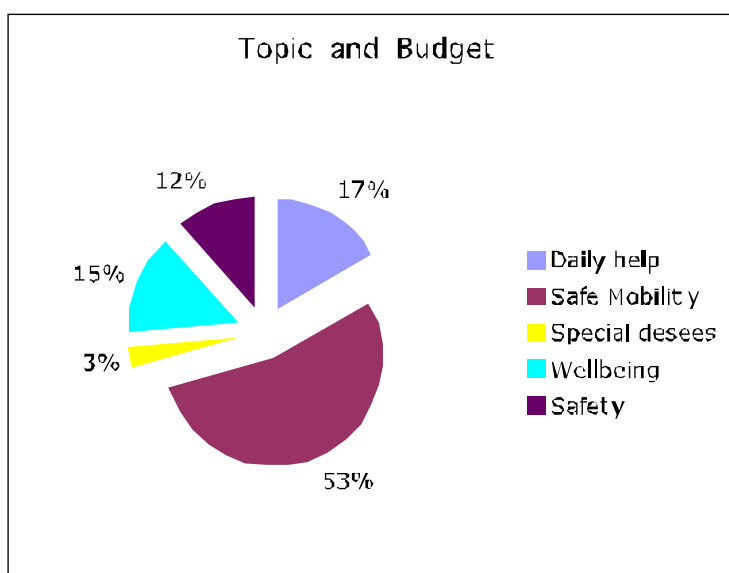
### 2.4.3 Considerations

Topic	Budget	Nº
Daily help	€10.710.672	5
Safe Mobility	€34.314.005	14
Special deseese	€1.934.259	1
Wellbeing	€9.465.684	3
Safety	€7.370.331	2
<b>TOTAL</b>	<b>€63.794.951</b>	<b>€25</b>

Table 2.4.3-1: Topic and budget

This call has been characterized on the mobility of seniors who took more than half of the budget. In fact, the mobility in the elderly may have many problems, the difficulty of remembering the routes to follow, the problems caused by reduced agility, the need for public services when they are out of the house, etc.

As you can see from the chart and tables in this call was also given a lot of importance to aid daily and the prevailing technology is to set the research on the development of innovative devices for this purpose. Only two projects have in-depth study of smart environments and only one project has seen the technology of robots. Three projects have based their work on the development of the social network; in this field much work was done in the second call that was mostly dedicated to socialize.

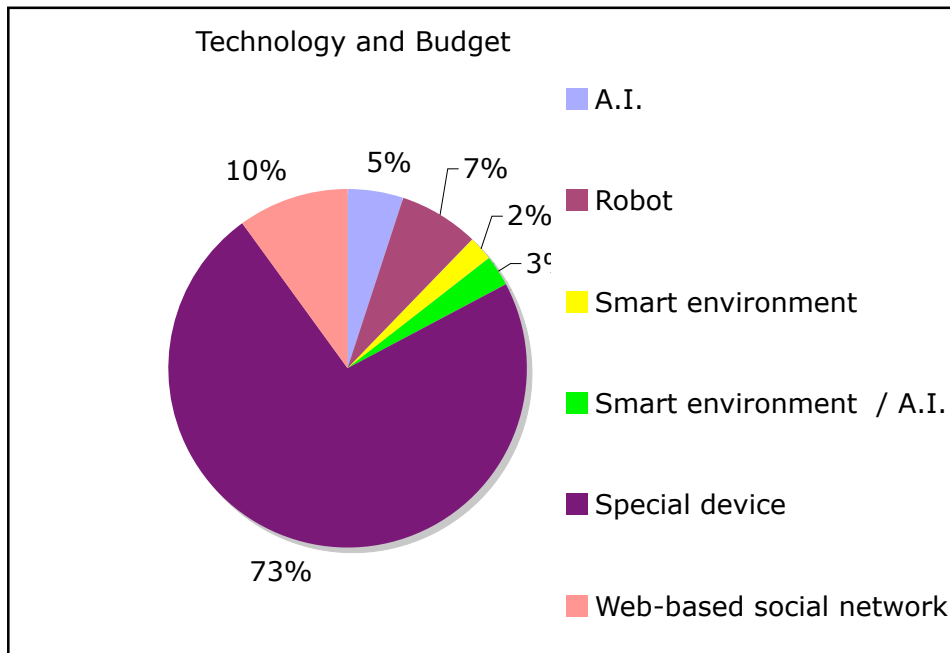


Graphic 2.4.3-1: Topic and budget in AAL projects of call 4

Technology	Budget	Nº
A.I.	€3.170.229	1
Robot	€4.559.117	1
Smart environment	€1.478.093	2
Smart environment / A.I.	€1.797.253	1
Special devices	€46.352.387	17
Web-based social network	€6.437.872	3
<b>TOTAL</b>	<b>€ 63.794.951</b>	<b>25</b>

Table 2.4.3-2: Topic and budget in AAL projects of call 4





Graphic 2.4.3-2: Technology and percentage of the budget

## **2.5 AAL projects call 5**

### **2.5.1 Short abstracts**

Most of the projects approved in the call 5 are not finished and it is impossible to access to the deliverables. For completeness, we report a list of summaries of the objectives of this call, but we have not developed the tables and charts as in the other call.

#### **BREATHE**

Budget: € 2.051.361 Starting Date: May 1, 2013 Duration: 30 Months

There are a number of problems that informal caregivers nowadays have to face: lack of experience and formal education in care, shortage of tools to manage the whole cycle, stress and depression. This is a well-known problem since family carers provide 80% of LTC in Europe. BREATHE platform will provide an ICT-based solution for the caregiver and the elderly in order to mitigate these problems and impact at three different levels: (1) personal, by increasing quality of life and care, (2) local and regional, by providing a tool usable by different stakeholders to effectively manage the reality of the informal care as well as by opening opportunities of new business models and employment and (3) European, by reducing health system costs as a consequence of an effective management of the informal care. The individual solution is based on a strong server side system that maintains updated models of both caregiver and assisted person and offers strategic support and customized guidance during the whole long-term care process.

#### **CaMeLi**

##### **Care Me for Life**

Budget: € 3.455.319 Starting Date: June 1, 2013 Duration: 24 Months

A coherent user-centric technological solution will be provided based on an innovative practice - oriented Virtual Partner (ViP) care model that considers established behaviour communication patterns/ways of an older person with a human partner when carrying out daily activities at home. The ViP model will be combined with state of the art human computer interaction (emotion recognition, intelligent dialogue) and user behavior analysis technologies. Specifically, the interaction with the user will be an innovative adaptive multimodal Avatar interface integrated and operating on a scalable distributed network of interconnected tablet devices, with integrated video cameras, installed on selected wall locations in the home of the user. The avatar will enable seamlessly continuous detection (via video) and analysis of the elderly behaviour in the totality of his home, as well as identification of his emotional state, based on voice intonation and facial expressions and taking into account the related context of the user's daily activity occurrences. In addition, the system provides a direct communication channel to the care community consisting of formal and informal carers that can assist older persons to carry out daily activities at home. The use of an avatar, instead of a human, has the major advantage that it is less threatening for the privacy and the users do not have the feeling that they are constantly under surveillance by a human (since they can turn it off at any time). Two pilots, in the Netherlands and Switzerland representing the two different use cases, will be carried out. Up to 200 elderly people and their caregivers will use CaMeLi over a six month period.

## **Care4Balance**

### **Care for balancing informal care delivery through on-demand and multi-stakeholder service design**

Budget: € 2.380.199    Starting Date: March 1, 2013    Duration: 30 Months

This always-on intelligent dashboard will be used to show status information and will enable communication and coordination towards the professional and the informal caregiver. The information to feed the status board will be collected both through user-generated input and through automatically collected contextual sensor data. The back end system will detect & analyse care demands and/or cumbersome situations. Multi-stakeholder design will be based on co-creation methodologies with the different users (elderly, informal and formal caregivers). The system will be realised with technological components available within the consortium, with focus on interoperability with other technologies. Living lab recruitment and testing will be done in three countries: in the Netherlands at the living lab of AMSTA (Amsterdam), in Belgium in the LeyLab living lab of Kortrijk and in France at the residential dwellings already served by Pervaya.

## **ChefMySelf**

### **Assistance solution for improving cooking skills and nutritional knowledge for independent elders**

Budget: Unknown    Starting Date: June 1, 2013    Duration: 24 Months

Independent older people with no severe illnesses or disabilities, but not excluding elderly with some mobility impairments or mild cognitive limitations. To assure the success of the development of the project, the users opinion and point of view will be taken always into account, starting from the investigation of the state of the art of the involved technologies and their perception, going through the design and development of the different modules of the solution, and finishing with the trials phase to be performed in their homes. The envisioned ChefMySelf system can be divided into three main components – Cloud Services, User Interface and Food Processor - each interacting with each over a set of secure, open and standardized interfaces. The proposed system will follow the cloud computing paradigm, ensuring security, scalability and reliability. To perform the usability test the system will be setup and demonstrated by the participating organizations at selected pilot sites (2 sites are foreseen: Italy and The Netherlands).

## **Dalia**

### **Assistant for Daily Life Activities**

Budget: € 2.840.748    Starting Date: April 1, 2013    Duration: 36 Months

The DALIA Personal Virtual Assistant will be created mainly for smart phones and Smart-TVs based on Android, chosen due to its wide deployment and open platform. For proper usage, the end-users need a suitable smart phone; for usage at home a Wi-Fi connection is sufficient, whereas for outside usage a data flat rate contract is recommended. The smartphone integrated sensors will be used for the measurement of health parameters. The base for the PVA will be ANNE, an avatar developed by consortium member Virtask which has already included speech- and face- recognition. The DALIA project will integrate its components in a service-oriented architecture, which allows for functionality decomposition, easy integration of new services, and reuse of already existing services in different applications. Two prototypes including user evaluation will ensure a solution tailor made for

the targeted end-users. Evaluation will involve a group of 20 to 30 yet-fit-enough 60+ people provided by the end-user partners.

## **EDLAH**

### **Enhancing Daily Life and Health through “One stop shop” user interaction**

Budget: € 2.800.000 Starting Date: May 1, 2013 Duration: 30 Months

EDLAH will utilise where possible existing technologies, adapting them as necessary, to be more appropriate to the older person and health care environment. The ‘One Stop Shop’ concept will bring together key lifestyle elements, medication, nutrition and exercise, object localisation, social communication, health education, efficient reporting etc. These elements will be made available in application format, via the most common media platforms, web, mobile and tablet. All platforms will be researched, whilst Android and IOS platforms, will be developed for commercialisation. Particular attention will be paid to the User Interface, ensuring good adaption to the older person, family members as well as health care professionals. Trials will be carried out with residents, families and professionals at the two Care home organisations (KHL and MRPS) partnering in the project. This testing will ensure a product and service that is relevant and operable across the community.

## **ELF@Home**

### **elderly sELF-care based on sELF-check of health conditions and sELF-fitness at home**

Budget: € 2.604.926 Starting Date: June 1, 2013 Duration: 36 Months

The proposed service will automatically generate a personalized fitness program based on the health status and the continuous monitoring of activity level of the user. This continuous monitoring will be accomplished by the development of a new wearable activity sensor specially designed for elderly needs. The health status monitoring will be done using biomedical sensors. A TV interface and a computer vision system will be used during fitness sessions to analyse fitness exercises execution. All these components will be connected to a service platform implementing the intelligence needed. The system will be tested by two groups of users: users who will be supervised by professional gerontologists, and elderly people living in spare areas and with no previous experiences with elderly fitness. The first group will allow the validation of the proposed system in comparison with the current approaches. The second group will validate technology deployment and usability in an important potential market

## **GeTVivid**

### **Let’s do things together**

Budget: € 3.334.052 Starting Date: July 1, 2013 Duration: 36 Months

Equipping an older adult’s home with different technologies is not the solution to create a perfect home environment but already available technologies hold the ability to make a useful contribution. The TV as an integral part of peoples’ everyday life can be found in many homes and is therefore one of the most widespread and familiar devices that influences people lives. While in former days the TV has been mainly used to retrieve news and as a medium for entertainment, Internet access has promoted the development of interactive TV. GeTVivid aims at supporting older adults with mild impairments to manage their daily activities in their home and aims at improving the quality of life, autonomy and participation in social life. Our overall goal is to design for “natural” and easy-to-learn interactions that will lower cognitive

demands and allow older persons to keep regular contact with people. Therefore, a platform connecting TV devices will be developed based on the HbbTV standard and complemented with a mobile second screen. Through push and pull customized information and services can be provided to the older adults. The access will be on-demand either by changing to a specific channel, pressing a button on the remote control or touching a button on the mobile frontend. By applying user-centred design the users and their activities, goals and characteristics are placed in the centre of the development process, i.e. the specification of potential services will be explored within this project together with them. As HbbTV is a rather new technology to many users and application developers, it will be crucial to get to know the affordances of the digital material (HbbTV) by exploring the properties (e.g., the combination with a second mobile screen).

## **HELICOPTER**

### **HEalthy Life support through COmPrehensive Tracking of individual and Environmental Behaviors**

Budget: € 2.880.010 Starting Date: July 1, 2013 Duration: 36 Months

Bad life habits play a major role in developing and progression of age-related diseases: nutrition, medical therapies and physical exercise are among the keys for prevention and control. Regular checking of health parameters is often overlooked, due to boredom, complexity or lack of motivation. HELICOPTER aims at inferring end-users' healthiness in an unobtrusive and simple way, through monitoring of daily life behaviours and will support end-user and their caregivers with feedback, advice, and motivation. The system will gather data coming from a heterogeneous set of (mostly off-the-shelf) devices, including medical, environmental and wearable sensors, to provide a qualitative and quantitative assessment of the activities carried out. This would make the health monitoring routine much less boring and demanding, possibly leading to reduce the need of frequent checking of clinical parameters and enable several services, fostering user's awareness and motivation and providing the caregiver with insights, alarms and reports.

## **MEDiATE**

### **Collaborative and interMEDiating solution for managing Daily Activities for The Elderly at home**

Budget: Unknown Starting Date: Unknown Duration: Unknown

The baseline activity around which MEDiATE is designed and deployed is a multi-functional and multi-role support to the requirement of the information circulation and coordination between the elderly and their informal network, as well as between the informal and the formal network. The fundamental originality of MEDiATE is to build upon the multi-talent openness, initiatives and active implication of all informal stakeholders, in the design, testing and dissemination of both the formal and more informal services. This aims basically at enriching the overall supportive capability to the elderly, in particular reinforcing the linkage between the social and medical strands of the care delivered, providing only the required information to the proper stakeholders. MEDiATE is a solution which is independent from any specific technology. It leaves room for the integration of other similar platforms or technological as well as service delivery evolutions in the future. To design such a system, a user-centred approach is in the heart of the development.

## **NITICS**

### **Networked InfrasTructure for Innovative home Care Solutions**

Budget: € 4.155.944 Starting Date: May 1, 2013 Duration: 27 Months

The NITICS project will build a flexible platform that will rely on a set of basic and task oriented services: localization of personal objects (keys, glasses, mobile); localization and movement pattern analysis of elderly and disabled people inside their homes - which, integrated with body sensors and environmental captors will support end-users as well as caregivers, family members, and others involved in assisting the person; a multimedia bi-directional platform (TV/PC/Smartphone) to ease, stimulate and support daily activities; augmented-reality system to assist users in finding the objects. NITICS will enable disabled persons to create, participate and continue their social activities not only via an Internet connection but also by using localization technology inside their homes, supporting an active social life. The localization technology is not only used to track and trace the assisted individual, nor just to gather objects' and predict their position, but also to detect unpredicted or abnormal behaviour, lack of movement or erratic behaviour, and to trigger actions by care providers in case of need . Such a system will help carers to intervene only in case of need, in a timely manner and provide the needed help, taking into account the preferences of care providers as well as family and end-users. The NITICS framework will provide major benefits to the end- users but will also provide benefits to caretakers and people directly involved in the care value chain.

## **RelaxedCare**

### **Unobtrusive connection in care situations**

Budget: € 3.062.000 Starting Date: May 1, 2013 Duration: 36 Months

RelaxedCare: follows the user-inspired innovation process in combination with ISO 9241 and basis its technological developments on existing AAL middleware platforms that will be adopted and extended. A focus is put on the mathematical models and algorithms for the multi-level behaviour pattern recognition approach including a social activity layer and the development of pervasive user interfaces that are nicely designed and fun to use. To create a working system, reliability and acceptance are crucial. Therefore two end user organisations as well as experienced designers and usability experts will include informal caregivers and assisted persons throughout the project in the development process. Basing RelaxedCare on working AAL infrastructure (middleware, components) from research institutions and extending it with innovative products from business orientated companies will put the focus on a solution with high potential to reach the AAL market designed by and with end users, for end- users.

## **Salig++**

### **Smart Assisted Living Involving Informal Caregivers**

Budget: € 4.175.433 Starting Date: June 1, 2014 Duration: 36 Months

People prefer to live independently in their own homes for as long as possible. However, demographic changes, rising costs and new family structures are increasing the demands for new care solutions. Self-care and informal carers will play a key role in these new solutions. In order to support the ability of informal carers it becomes essential to reduce the impact of physical distance, increase informal carer presence in the daily life of elderly and to support cooperation between formal and informal carers to foster complementarity. To address these

challenges, new care solutions should go beyond state of the art and enhance presence, awareness and complementarity. The SALIG++ project offers novel solutions based on ICT-support for self-care by elderly and the bidirectional awareness and interaction between elderly and informal carers in collaboration with formal care in order to promote and prolong the well-being of elderly in living at home. SALIG++ makes it possible for carers to, for example, visit the home of the elderly from a distance and experience it as if they were actually there. The primary benefit is that carers become fully informed about the status of the elderly, her medical status as well as her home and devices (such as stove and faucets). The key components of SALIG++ are three-dimensional (3D) AV capturing and visualization in combination with sensing, actuation and identification techniques in support of remote presence and awareness. These techniques are introduced in the home as self-managed extensions to existing home audio visual equipment such as a networked media centre and surround systems, thereby avoiding introducing new intrusive physical apparatus, such as mobile robots .

## **TOPIC**

### **The Online Platform for Informal Caregivers**

Budget: € 745.095      Starting Date: May 1, 2013      Duration: 36 Months

In TOPIC, we aim at providing a solution by diminishing family carers' burden, by then decreasing all the related problems, and offer them a better quality of life and independence. It will then reduce all the related costs of these "hidden patients". The solution we offer to develop, the CarePortfolio, will provide multimodal social support to informal carers by means of a set of accessible online services, which would be available at all times via a portal, available on the Internet, via tablets, smart phones, and/or iTV. This set of services will cover the three dimensions of social support: informational, emotional, and tangible. Informational support means the flow of information, advice, or opinions that allow an individual to assess and understand the problem she/he is facing. Emotional support refers to sympathy, empathy, friendship, or love expressed through the support. This dimension is generally recognised as essential to social support. Tangible support means providing support in terms of goods (e.g., donated clothing or equipment) or services (for example, providing assistance in completing the paperwork). This way, TOPIC contributes to the research and industrial production of systems for elderly population and health care settings in Europe. How these systems will be deployed in the market will be defined via the definition of rental services by the business partners.

## **understAID**

### **A Platform that helps informal caregivers to understand and aid their demented relatives**

Budget: € 1.526.217      Starting Date: April 11, 2013      Duration: 36 Months

The understAID project focuses on easing the lives of informal caregivers and directly addressing their currently unmet needs for accessible educational support. The solution will be based on new user-centred, personalized and context-based e-learning models that will provide customized and relevant guidance on how to deal with dementia and their inflicted relatives. The project's major novelty consists of the development of a sophisticated search methodology – based on advanced interactive profiling and surveying methods – for matching learning material and content with an individual's situational context and needs. This represents considerable advancements over today's information search and classification system. understAID will help the informal caregiver look ahead to and prepare for future

situations and thus provide prophylactic content in mobile and web applications. The understAID solutions will involve and be tested among end users in Denmark, Spain and Poland – and individuals heavily burdened by demented relatives will constitute the main target group. After testing, the consortium expects to start commercializing understAID solutions 6 months post-project in the 3 countries.

## **VictoryaHome**

### **A robot for integrated care@home and peace of mind of carers**

Budget: € 2.360.000 Starting Date: April 1, 2013 Duration: 36 Months

Be Well – VictoryaHome – Create Possibilities; this is the vision of a project that does not depend on automated functions, but augments them with immediate human presence when needed or desired by older adults or their caregivers. What if at Irene’s home there was a robot that “knows” what is happening with her in the house and share this knowledge with her carers? It does not tell all it knows, but will let them know when there might be a problem. The robot knows its user, if she took medication and when, whether she is taking enough water, what her activity level is or if she has fallen down and it can automatically call for help. At this stage the carer can come in the house “virtually” using the tele- presence function. The robot will put in Irene’s hands the responsibility of drinking water more frequently, taking the medicines on time and being more active. She knows this will let her carers stay informed regarding key status indicators and activities, showing she is OK so that the carers will feel greater confidence. The tele-presence function of the robot is the starting point and it will be expanded with additional services. This will be done based upon an iterative design process with older adults, informal carers, formal carers and other stakeholders. Four trials will take place in Norway, Sweden, the Netherlands and Portugal where older adults at home will interact with remote informal carers and professional carers using the developed VictoryaHome services.

## **YouDo**

### **We help!**

Budget: € 2.827.260 Starting Date: September 1, 2013 Duration: 36 Months

The number of people in need of care increases constantly because of the increasing average age & quantity of people with physical limitations, especially in Europe. Also, there is manpower shortage in the care sector, which is more & more in financial straits. This is the reason why very many seniors will depend on their close relatives for the care needs. These people need help in overcoming the challenges they have to face & their problem is a lack of needed knowledge. The first confrontation with the notion of an intensive support for their family members comes often insidiously (e.g. dementia) or suddenly (e.g. stroke) through changing live circumstances. In such situations the relatives need solutions, orientation & support – especially to analyse their own realistic possibilities & abilities. They should have access to all information that will help them to fulfil their role as informal carers; to all special training programs aimed to improving the quality of their nursing. The innovation of our idea consists of gathering all the needed content for the top 6 care topics distributed to the informal carer on their personal trusted device (TV-set or computer) – depending on their age & preferences. In a 2nd step we have to research in which way the content could be transformed, so that the end user really understands it. With the TV technology we use it is possible to set up own IP-TV-channels & feed them with own content.



## 2.5.2 Summary table of AAL call 5 projects

Project	Starting date Duration	Total budget	Disabled / Elderly	Topic	Target	Technology	M€
<b>BREATHE</b>	May 1, 2013 30 Months	€2.051.361	D/E	Daily help	Increase quality of life and care	Web based social network	2,0
<b>CaMeLi</b> Care Me for Life	June 1, 2013 24 Months	€3.455.319	E	Daily help	Behaviour analysis with avatar	Artificial intelligence	3,5
<b>Care4Balance</b> Care for balancing informal care delivery through on-demand and multi-stakeholder	March 1, 2013 30 Months	€2.380.199	E	Safety	Monitor status information	Sensor Networks	2,4
<b>ChefMySelf</b> Assistance solution for improving cooking skills and nutritional knowledge for independent elders	June 1, 2013 24 Months	Unknown	D/E	Daily help	Help on cooking	Special devices	Unknown

<b>Project</b>	<b>Starting date Duration</b>	<b>Total budget</b>	<b>Disabled / Elderly</b>	<b>Topic</b>	<b>Target</b>	<b>Technology</b>	<b>M€</b>
<b>Dalia</b> Assistant for Daily Life Activities	April 1, 2013 36 Months	€2.840.748	D/E	Daily help	Personal Virtual Assistant for smartphones, TV	Special devices	2,8
<b>EDLAH</b> Enhancing Daily Life and Health through “One stop shop” user interaction	May 1, 2013 30 Months	€2.800.000	D/E	Daily help	Bring together key lifestyle elements, medication, nutrition and exercise	Special devices	2,8
<b>ELF@Home</b> Elderly sELF-care based on sELF-check of health conditions and sELF-fitness at home	June 1, 2013 36 Months	€2.604.926	D/E	Measure mental (and motor) abilities	Personalized fitness program based on the health status	Special devices	2,6
<b>GeTVivid</b> Let’s do things together	July 1, 2013 36 Months	€3.334.052	E	Daily help	Services for elderly using TV	Special devices	3,3
<b>HELICOPTER</b> Health Life support through COMprehensive Tracking of individual and Environmental Behaviours	July 1, 2013 36 Months	€2.880.010	E	Wellbeing	Pinpoint bad life habits	Sensor Networks	2,9

<b>Project</b>	<b>Starting date Duration</b>	<b>Total budget</b>	<b>Disabled / Elderly</b>	<b>Topic</b>	<b>Target</b>	<b>Technology</b>	<b>M€</b>
<b>MEDiATE</b> Collaborative and intermediating solution for managing Daily Activities for The elderly at home	Unknown	Unknown	E	Interoperability between platforms and languages	Reinforcement of the linkage between the social and medial strands	Web-based social networks	Unknown
<b>NITICS</b> Networked InfrasTructure for Innovative home Care Solutions	May 1, 2013 27 Months	€4.155.944	D/E	Safe mobility	Localization of personal objects, movement analysis inside homes	Sensor networks	4,2
<b>RelaxedCare</b> Unobtrusive connection in care situations	May 1, 2013 30 Months	€3.062.000	D/E	Daily help	Multi-level behaviour pattern recognition	Artificial intelligence	3,0
<b>Salig+</b> Smart Assisted Living Involving Informal Caregivers	June 1, 2014 36 Months	€4.175.433	E	Wellbeing	Reduce the impact of physical distance	Special devices	4,2
<b>TOPIC</b> The Online Platform for Informal Caregivers	May 1, 2013 36 Months	€745.095	E	Wellbeing	Set of accessible online services	Web-based social networks	0,7
<b>understAID</b> A Platform that helps informal caregivers to understand and aid their demented	April 11, 2013 36 Months	€1.526.217	E	Specific diseases	Dementia	Web-based social networks	1,5

<b>Project</b>	<b>Starting date Duration</b>	<b>Total budget</b>	<b>Disabled / Elderly</b>	<b>Topic</b>	<b>Target</b>	<b>Technology</b>	<b>M€</b>
relatives							
<b>VictoryaHome</b> A robot for integrated care@home and peace of mind of carers	April 1, 2013 36 Months	2.360.000	E	Daily help	Tele-presence	Robot	2,4
<b>YouDo</b> We help!	September 1, 2013 36 Months	€2.827.260	E	Special diseases	Dementia, Stroke	Special devices	2,8
<b>TOTAL</b>		€41.198.564					

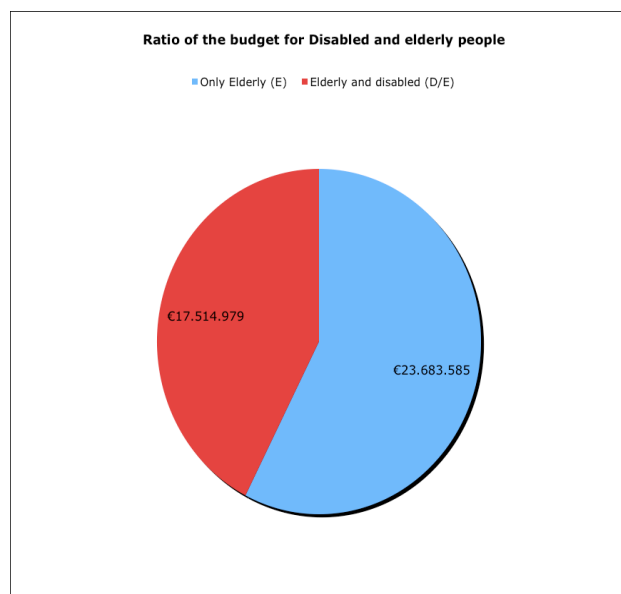
*Table 3.5.2 -1: Summary table of AAL call 5 projects*

## 2.5.2 Considerations

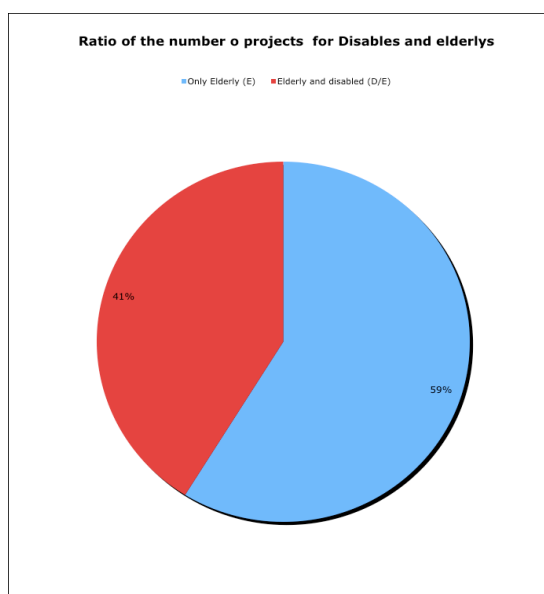
### ***Elderly(E) or Disabled and Elderly(D/E)***

	Euros	N° projects
Only Elderly (E)	€23.683.585	10
Elderly and disabled (D/E)	€17.514.979	7
	<b>€41.198.564</b>	<b>17</b>

Table 2.5.2-1: Elderly problems or disabled problems



Graphic 2.5.2-1: D&E budget



Graphic 2.5.2-2 D&E percentage of budget

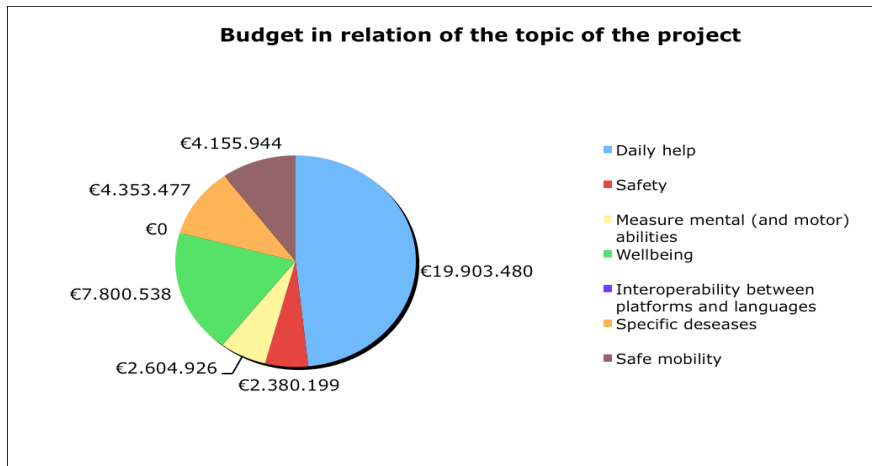
The average budget for each project was 2.423.445 (total budget/number of projects) and if we multiply this mean for 7 that is the number of D/E projects it is 16.964.115 and for 10 (the number of E projects) it is 24.234.449. We can deduce that E projects and E/D projects had a very similar cost.

Same reasoning can be applied to the topic with the exception of "Safe mobility" which costs about ninety % more than the average.

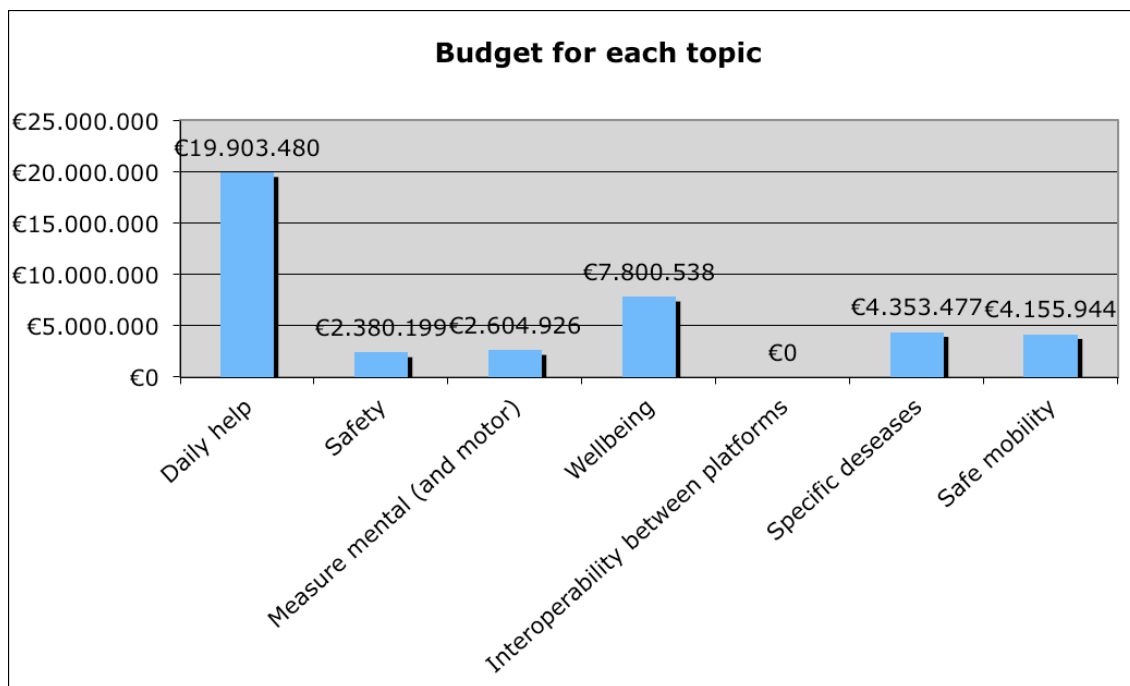
### ***Topic***

	N°	€	Mean project cost * N° of projects
Daily help	8	€19.903.480	€19.387.560
Safety	1	€2.380.199	€2.423.445
Measure mental (and motor) abilities	1	€2.604.926	€2.423.445
Wellbeing	3	€7.800.538	€7.270.335
Interoperability between platforms and languages	1	<i>Unknown</i>	€2.423.445
Specific diseases	2	€4.353.477	€4.846.890
Safe mobility	1	€4.155.944	€2.423.445
<b>TOTAL</b>	<b>17</b>	<b>€41.198.564</b>	

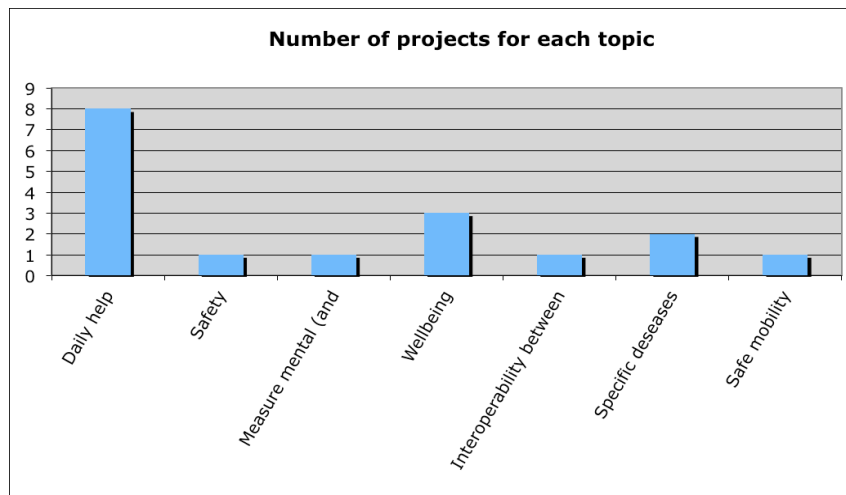
Table 2.5.2-2: Topic investments in AAL call 5



Graphic 2.5.2-3: Budget of topics in AAL call 5 (Pie)



Graphic 2.5.2-4: Budget of topics in AAL call 5 (bar chart)



Graphic 2.5.2-5: Number of projects for each topic in AAL call 5

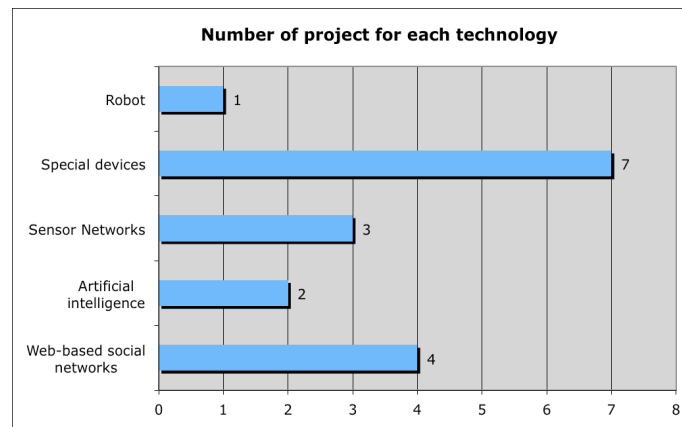
We can deduce that all topics have the same cost with the exception of “Safe mobility” that have a cost higher than the average of other projects; but as only one project had this topic the statistic is not significant.

The table shows the cost of projects grouped by technology and a column in which the cost is calculated by taking the average cost of projects of this Call (€ 2,423,445) multiplied by the number of projects in each group.

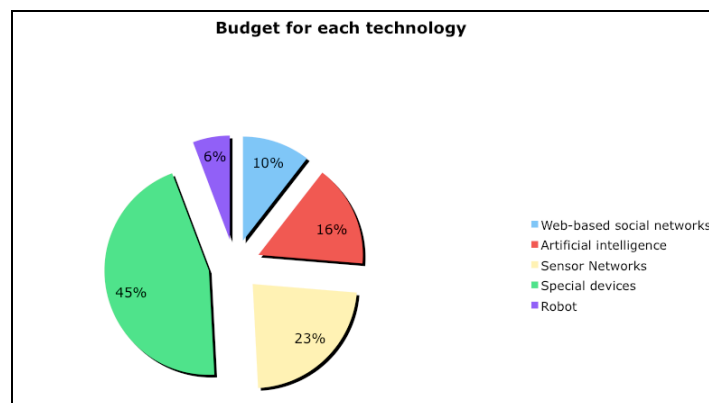
We noted that the various technologies have similar costs with the exception of "" which costs about double the average calculated.

<b>Technology</b>			Mean project cost * N° of projects
	<b>N°</b>	<b>€</b>	
Web-based social networks	4	€4.322.673	€9.693.780
Artificial intelligence	2	€6.517.319	€4.846.890
Sensor Networks	3	€9.416.153	€7.270.335
Special devices	7	€18.582.419	€16.964.115
Robot	1	€2.360.000	€2.423.445
<b>TOTAL</b>	<b>17</b>	<b>€41.198.564</b>	

Table 2.5.2-3: Budget and technology



Graphic 2.5.2-6: Number of projects for each technology used



Graphic 2.5.2-7: Percentage of the budget for each technology

From the graphs and tables above we can deduce that this call has favoured the design of “special devices” and that technologies are more expensive “Sensor Networks” and Special devices” while the less expensive ones are the ones that we have signed as “Web-based social networks” and “Artificial intelligence”.

### **3. Overview of related European Seventh Framework Programme projects**

#### **3.1 Sixth Framework programme**

##### **3.1.1 Short abstracts**

###### **I2HOME**

###### **Intuitive interaction for everyone with home appliances based on industry standards**

Budget: € 4.903.161 Starting Date: September 1, 2006 Duration: 40 Months

I2HOME will address the problem of living an independent life and realizing full potential with an approach based on existing and evolving industry standards. They will focus on the use of home appliances by persons with cognitive disabilities and older persons. At the same time the project will take care that the developed and standardized access strategies will be applicable to domains beyond the home.

In I2HOME, participants will build upon a new series of industry standards (ANSI/INCITS 389ff) for interfacing networked appliances by means of a Universal Remote Console (URC). They will use architecture with a Universal Control Hub (UCH) as core component that communicates to networked (off-the-shelf) home appliances and consumer electronics devices through industry networking protocols.

The UCH will provide intelligent and adaptable interfaces that are particularly targeted to persons with cognitive disabilities and older persons. The user interfaces will be designed according to the results of a broad requirements analysis and will include multi-modal communication and activity management. In an incremental process, the project will conduct large evaluations of the project intermediate results in controlled laboratory environments as well as in day-care centres.

###### **Soprano**

###### **Service-oriented Programmable Smart Environments for Older Europeans**

Budget: € 11.698.547 Starting Date: January 1, 2007 Duration: 40 Months

The SOPRANO project aims to develop affordable, smart ICT-based assisted living services with interfaces which are easy to use for older people and familiar in their home environment. The societal trends that SOPRANO is responding to are:

- the increase in the proportion of older citizens in the population due to demographic change the scale and type of needs of older citizens which society must plan to meet, the rejection of current ICT-based services by many older citizens, and the steady deterioration of non-ICT-based service provision in the Information Society;
- the poverty of offer of ICT-based services usable by older citizens;
- the difficulty of designing ICT-based services to be usable by older citizens.

SOPRANO is developing supportive environments for older people based on the concept of "ambient assisted living", using information and communication technologies (ICT5) to enable older people to live independently in their own homes. SOPRANO will not only address the "problems" of old age (e.g., falls, health problems), but will focus on positively



enhancing the quality of life of older people. Focus groups and interviews with older people and care providers identified a number of potential opportunities for the development of SOPRANO. Social isolation has profound negative outcomes such as loneliness, depression, boredom, social exclusion and disruption of patterns of daily living.

SOPRANO project foresees an "avatar" (an interactive computer-generated assistant; pictured here) on a TV screen that will be able to interact with the person in their home using natural language, for example, providing prompts for what exercises to carry out and reminding people to leave their house in a safe and secure manner when they go out (e.g., locking doors, shutting windows).

Social isolation may be alleviated through the more extensive use of video-telephony to link older people who live alone with their family and friends. Many of the features of SOPRANO will be useful for people with mild dementia: particularly those that help and support people to carry out everyday tasks of living. However, extensive research and development is required to ensure that the interaction media (interfaces, avatars, etc.) are appropriate for a diverse range of potential users, such as people with dementia, or those with sensory impairments.

### 3.1.2 Summary table (Sixth Framework programme)

Project	Starting Date Duration	Total budget	D/E	Topic	Target	Technology	M€	More tech information
<b>I2Home</b> Intuitive interaction for everyone with home appliances based on industry standards	September 1, 2006 40 Months	€ 4.903.161	E	Daily help	Evolving industry standards	Special devices	4,9	
<b>Soprano</b> Service-oriented Programmable Smart Environments for Older Europeans	January 1, 2007 40 Months	€ 11.698.547	E	Daily help	Against social isolation with avatar	Special devices	11,7	

*Table 3.1.2-1: Summary table of selected projects of Sixth Framework programme*

### **3.1.2 Considerations (6<sup>th</sup> FP)**

As very few projects have been selected from FP6, it does not make sense to do statistics. The projects were chosen for the argument that deal with the inherent issues addressed in this report and for how projects have been conducted. It seems therefore useful to name them and report their data.

## **3.2 Seventh Framework Programme**

The following table reports selected FP7 European project related to AAL field.

### **2.2.1 Short abstracts**

#### **3D-LIVE**

##### **Living Interactions through Visual Environments**

Budget: € 1.737.833    Starting Date: September 1, 2012    Duration: 24 Months

The 3D-LIVE project aims to develop and experiment a User Driven Mixed Reality and Immersive (Twilight) platform connected to EXPERIMEDIA facilities in order to investigate the Future Internet (FI) broadband capacity to support Real-Time immersive situations as well as evaluating both the Quality of Experience (QoE) and Quality of Services. The main objective consists to explore 3D/Media technologies and IoT in real and virtual environments in order to sense and experiment live situations.

#### **3DTV**

##### **3DTV Content Search**

Budget: € 3.517.641    Starting Date: November 1, 2011    Duration: 24 Months

The goal of the 3DTV project is to devise scalable 3DTV AV content description, indexing, search and browsing methods across open platforms, by using mobile and desktop user interfaces and to incorporate such functionalities in 3D audio-visual content archives. The major novelty in 3DTV content indexing/retrieval research will be on how to exploit 3D (depth) information for stereo and multi-view video indexing, retrieval and browsing that could address semantic queries of the form ‘find stereo videos with shallow depth’ or ‘find stereo videos, where actor X approaches actor Y’.

#### **AALIANCE**

##### **European ambient assisted living innovation alliance**

Budget: € 1.657.340    Starting Date: January 1, 2008    Duration: 26 Months

Subject of the Coordination Action AALIANCE will be Ambient Assisted Living (AAL) solutions based on advanced ICT technologies for the areas of aging at work, aging at home and aging in the society. AALIANCE will: (i) provide a framework for stakeholders, led by industry, to define research and development priorities, timeframes and action plans on strategically important issues in the field of Ambient Assisted Living; (ii) play a key role in ensuring an adequate focus of research funding for AAL, in fostering effective public; (iii) private partnerships and in developing a European research policy, in particular in focusing on FP7 and on current activities launched by EU member states (AAL 169).

## **ACCESSIBLE**

### **Accessibility assessment simulation environment for new applications design and development**

Budget: € 3.571.925 Starting Date: September 1, 2008 Duration: 41 Months

The triggering idea behind ACCESSIBLE is to contribute for better accessibility for all citizens, to increase the use of standards, and to develop an assessment simulation environment (including a suite of accessibility analysing tools as well as developer-aid tools) to assess efficiently, easily and rapidly the accessibility and viability of software applications for all user groups.

## **ACCOMPANY**

### **Acceptable robotiCs COMPanions for AgeiNg Years**

Budget: € 4.825.492 Starting Date: October 1, 2011 Duration: 36 Months

The proposed ACCOMPANY system will consist of a robotic companion as part of an intelligent environment, providing services to elderly users in a motivating and socially acceptable manner to facilitate independent living at home. The ACCOMPANY system will provide physical, cognitive and social assistance in everyday home tasks, and will contribute to the re-ablement of the user, i.e. assist the user in being able to carry out certain tasks on his/her own. Services to the user will be delivered through socially interactive, acceptable and empathic interaction, building on computational models of robot social cognition and interaction.

## **ALFRED**

### **Personal Interactive Assistant for Independent Living and Active Ageing**

Budget: € 4.440.741 Starting Date: October 1, 2013 Duration: 36 Months

ALFRED will foster independent living and active ageing, integrating interactive services for elderly people and for care-takers. It will prevail age-related physical and cognitive impairments through the effective use of ICT and the better coordination of care processes. In order to achieve those objectives, the project will create a virtual, interactive assistant for elderly people. This assistant will be realized as a mobile device running on day-to-day Android smartphones allowing a wide impact of the project results. ALFRED will be fully voice-controlled and combine latest scientific research results from mobile development, data management, context aware services, speech recognition and personal data management, combined with activities from behavioural and social science.

## **ALLOW Ensembles**

### **Adaptable Pervasive Flows**

Budget: € 3.893.424 Starting Date: February 1, 2013 Duration: 36 Months

The objective of ALLOW Ensemble is to develop a new design principle for large-scale collective systems (CAS) based on the concepts of cells and ensembles. Cells are basic building blocks representing the different components of the system and ensembles are collections of cells collaborating together to accomplish certain goal in a given context. We use Adaptive Pervasive Flows – a programming paradigm based on workflow technology for pervasive systems – to model the behavior of cells as a set of interrelated tasks. This enables the salient principle of cell specialization. It allows for changing the behavior of the

individual cell (tasks and order of execution) to fit into an ensemble and to achieve a given goal with high utility in collaboration with other cells of the ensemble.

## **ALTEREGO**

### **Enhancing Social Interaction with an AlterEgo Artificial Agent**

Budget: € 3.834.912 Starting Date: February 1, 2013 Duration: 36 Months

The objective of AlterEgo is the creation of an interactive cognitive architecture, implementable in various artificial agents, allowing a continuous interaction with patients suffering from social disorders. The AlterEgo architecture is rooted in complex systems, machine learning and computer vision. The project will produce a new robotic-based clinical method able to enhance social interaction of patients. This new method will change existing therapies, will be applied to a variety of pathologies and will be individualized to each patient. AlterEgo opens the door to a new generation of social artificial agents in service robotics.

## **ARGUS**

### **Assisting peRsonal GUIDance System for people with visual impairment**

Budget: € 2.638.898 Starting Date: March 1, 2010 Duration: 30 Months

ARGUS project focuses onto a satellite based navigation (GNSS/ EDAS) terminal for people with impaired visually capabilities, guiding them along pre-defined tracks (pre recorded or automatically calculated route), using specifically designed HMI such as acoustic and haptic signals. ARGUS project introduces the opportunity to develop an innovative guidance support system for visual impaired people based on the provision of a track perception to the end user through holophonic technologies. Neither research or patents, nor products, have solved the problem of providing a track line perception.

## **BRAID**

### **Aiding SuStainable Independent Senior TrAvellers to Navigate in Towns**

Budget: € 1.200.414 Starting Date: October 1, 2011 Duration: 28 Months

BRAID will develop a comprehensive RTD roadmap for active ageing by consolidating existing roadmaps and by describing and launching a stakeholder co-ordination and consultation mechanism. It will characterize key research challenges and produce a vision for a comprehensive approach in supporting the well-being and socio-economic integration of increasing numbers of senior citizens in Europe. BRAID responds to the apparent need to consolidate the various existing perspectives, plans, roadmaps and research and to coordinate effectively the stakeholders in ICT and Ageing.

## **BRAIN**

### **BCIs with rapid automated interfaces for nonexperts**

Budget: € 4.063.619 Starting Date: September 1, 2008 40 Months

The goal of the Human Brain Project is to build a completely new information computing technology infrastructure for neuroscience and for brain-related research in medicine and computing, catalysing a global collaborative effort to understand the human brain and its diseases and ultimately to emulate its computational capabilities.

## **C-SPACE**

### **An affordable tool to turn the space surrounding us into a creative experience**

Budget: € 2.928.180 Starting Date: November 1, 2013 Duration: 30 Months

C-Space benefit from this trend and deliver a low-cost solution to reconstruct 4D scenes (3D plus time) of indoor or outdoor events from casual real-world footage (e.g. captured by mobile phones) through Video Based Rendering (VBR) techniques. In c-Space, the 4D scene becomes a spatio-temporally sorted repository of the digital resources available.

## **CAPSIL**

### **International support of a common awareness and knowledge platform for studying and enabling independent living**

Budget: € 786.618 Starting Date: January 7, 2008 Duration: 24 Months

CAPSIL's goals were to analyse state of the art ICT solutions from the EU, US and Japan and produce a Roadmap and partner WiKi site outlining the analysis and recommendations of our CAPSIL Coordinating Support Action (CSA) team. This team is a strategic international coalition of University and Industrial partners with extensive teams developing hardware, software, and knowledge solutions for independent living, based on user requirements. The analysis and solutions have been incorporated into WiKi entries (CAPSILs) providing a state of the art knowledge platform for researchers, developers and policy makers. The CAPSILs allow visitors to quickly and easily access information and test solutions for prolonging independent living within the many and various heterogeneous communities.

## **COMPANIONABLE**

### **Integrated cognitive assistive and domotic companion robotic systems for ability and security**

Budget: € 10.715.167 Starting Date: January 1, 2008 Duration: 54 Months

CompanionAble addresses the issues of social inclusion and homecare of persons suffering from chronic cognitive disabilities prevalent among the elderly, a rapidly increasing population group. Those people need support of carers and are at risk of social exclusion, yet this problem not well addressed by ICT technology, but would lead to a social and economic pressure for staying at home as long as possible. The main unique selling point of the Companionable project lies in the synergetic combination of the strengths of a mobile robotic companion with the advantages of a stationary smart home, since neither of those approaches alone can accomplish the demanding tasks to be solved.

## **CONFIDENCE**

### **Ubiquitous care system to support independent living**

Budget: € 4.659.223 Starting Date: February 1, 2008 Duration: 36 Months

The main objective of this proposal is the development and integration of innovative technologies for the detection of abnormal events (such as falls) or unexpected behaviours that may be related to a health problem in elderly people.

## **CYBEREMOTIONS**

### **Collective emotions in cyberspace**

Budget: € 4.636.660 Starting Date: February 1, 2009 Duration: 48 Months

The main aims of the project are: - to understand the process of collective emotions formation in e-communities as a spontaneous emergent behaviour occurring at complex techno-social networks; - to create decentralized adaptive tools to amplify positive or suppress negative collective emotions in e-societies and will take into account heterogeneity of interacting humans; - to create theoretical background for the development of the next generation emotionally-intelligent ICT services using models of self-organized active agents models, and socio-physics methods.

## **DALI**

Budget: € 4.418.900 Starting Date: January 1, 1996 Duration: 18 Months

DALI will use multimedia telematics for better all-round services in towns and cities. It will thus boost the quality of urban life, particularly among disadvantaged groups like the elderly, and support the take-up of information technology by local small and medium-sized enterprises (SMEs). The project will address the regular demand for improved user-driven services at lower cost to the taxpayer, while also seeking to satisfy the public need for cross-sectoral administration traditionally delivered via vertical structures. Technical features will include a two-way multimedia communication channel, Smart Card multi-service system and a customised services tele-centre.

## **EHEALTHMONITOR**

### **Intelligent Knowledge Platform for Personal Health Monitoring Services**

Budget: € 4.078.283 Starting Date: December 1, 2011 Duration: 36 Months

The eHealthMonitor project provides a platform that generates a Personal eHealth Knowledge Space (PeKS) as an aggregation of all knowledge sources (e.g., EHR and PHR) relevant for the provision of individualized personal eHealth services.

## **EPAL**

### **Extending professional active life**

Budget: € 1.120.127 Starting Date: February 1, 2008 Duration: 24 Months

Project ePAL aims to explore innovative ways to best facilitate the development of the active ageing process and to ensure an improved transition for the elderly citizen as they cope with the onset of age. The ePAL vision - addressing new levels of quality of life - is that of an effective transformation of the current situation regarding retirement and the barriers to active ageing in Europe by introducing new approaches and ways to create actively contributing professional communities in society, which provides the elderly citizen with a supporting framework for leveraging their talents and expertise and creates value for the benefit of the Europe's economy.

## **FLORENCE**

### **Multi Purpose Mobile Robot for Ambient Assisted Living**

Budget: € 5.635.657 Starting Date: February 1, 2010 Duration: 36 Months

Florence will keep elderly independent much longer by providing care and coaching services, supported by robots. This will greatly improve the efficiency in care and reduce costs. The

second problem addressed by Florence is the acceptance of robots by elderly. For this purpose the project adopts a user-centric approach, by starting with focus-group sessions, having lab-tests in the OFFIS IDEAAL lab, and finally evaluating the services in the Granada AAL living labs.

## **GIRAFF+**

### **Combing social interaction and long term monitoring for promoting independent living**

Budget: € 4.038.575 Starting Date: January 1, 2012 Duration: 24 Months

The Giraff+ project is developing a system consisting of a network of home sensors that measure e.g. blood pressure or temperature, or detect e.g. whether somebody occupies a chair, falls down or moves inside a room. The data from these sensors are interpreted by an intelligent system in terms of activities, e.g. the person is going to bed, and health and wellbeing, e.g. the person is tired or well rested.

## **HAVISIO**

### **Enhanced visibility and awareness in eHealth, Active Ageing and Independent Living projects**

Budget: € 416.652 Starting Date: November 1, 2013 Duration: 24 Months

The proposed project will engage all relevant projects in a collective and synergetic way, identifying best-practices, involving the most active partners and stakeholders and disseminating widely the added value and assets generated from each project. It will link and work in tandem with almost all relevant projects funded by the EC.

## **HERMES**

### **Cognitive care and guidance for active aging**

Budget: € 4.193.355 Starting Date: January 1, 2008 Duration: 24 Months

HERMES provides an innovative integrated approach to cognitive care covering the domain of cognitive support and training. This is achieved through an advanced, integrated, assistive technology that combines the functional skills of the older person to reduce age-related decline of cognitive capabilities and assist the user where necessary. Based on intelligent audio and visual processing and reasoning, the project results in a combination of a home-based and mobile device to support the user's cognitive state and prevent cognitive decline.

## **MARE**

### **Market requirements, barriers and cost-benefit aspects of assistive technologies**

Budget: € 698.560 Starting Date: September 1, 2008 Duration: 18 Months

MARE is an 18 month support action which aims to carry out a technology and foresight analysis in the field of Assistive Technologies (AT). AT are all technologies used in daily life to improve quality of life and to live independently for longer. Typically AT refers to those devices that are designed with electronics, microprocessors and high performance materials which allow: powered mobility, augmentative communication, environmental control and the use of microcomputers.



## **MIRACULOUS-LIFE**

### **Miraculous-Life for Elderly Independent Living**

Budget: € 4.195.276 Starting Date: December 1, 2013 Duration: 36 Months

The main aim of the Miraculous-Life project is to design, develop and evaluate an innovative user-centric technological solution, the Virtual Support Partner (VSP), attending to the elder (65+) daily activity and safety needs, while the elder goes about his normal daily life. The VSP will provide implicit daily activities support which is based on behaviour and emotional understanding and appropriate respond exhibiting distinctive emotions, deliver in a human like way simulating in essence the interaction with a real life partner.

## **MOBISERV**

### **An integrated intelligent home environment for the provision of health, nutrition and mobility services to the elderly**

Budget: € 3.600.742 Starting Date: December 1, 2009 Duration: 44 Months

The main objective of the Mobiserv project was to design and evaluate an intelligent proactive personal robot, integrated with innovative smart home sensors and smart textiles, and to offer home care for (semi-)independent living with a focus on health, nutrition, well-being, and safety.

## **OASIS**

### **Open architecture for accessible services integration and standardisation**

Budget: € 12.232.272 Starting Date: January 1, 2008 Duration: 36 Months

OASIS is an Integrated Project with the scope to revolutionise the interoperability, quality, breadth and usability of services for all daily activities of older people. More specifically, OASIS targets to utilise ICT and other key technologies in order to provide holistic services to older people to support their physical and psychological independence, stimulate their social or psychological engagement and foster their emotional wellbeing. In doing so, OASIS thus addresses key areas of their activities encompassing: independent living and socialising, autonomous mobility, and flexible work-ability.

## **PREVIOUS**

### **PREdictive digitization, reStoration and degradatiOn assessment of cultUral heritage objectS**

Budget: € 3.597.408 Starting Date: February 1, 2013 Duration: 36 Months

PREVIOUS aims to improve motivation using a combination of motivational interview and gamification principles, as well as creating a personalised system that adapts to the users' goals and preferences. The system will collect information about the user from a variety of devices and applications (sensors) that measure food intake, physical activity, stress levels and sleep patterns.

## **SENIOR**

### **Social ethical and privacy needs in ICT for older people: A dialogue roadmap**

Budget: € 1.333.098 Starting Date: January 1, 2008 Duration: 24 Months

It aims to provide a systematic assessment of the social, ethical, and privacy issues involved

in ICT and Ageing, to understand what lessons should be learned from current technological trends, and to plan strategies for governing future trends.

## **SMILING**

### **Self mobility improvement in the elderly by counteracting falls**

Budget: € 2.868.050 Starting Date: January 1, 2008 Duration: 18 Months

Mobility means freedom, flexibility and autonomy for all citizens, including older persons. Aging is characterized by functional changes in the sensory, neurological and musculoskeletal systems, affecting motor tasks including gait and postural balance. Gait and balance disturbances in elderly are the main risk factor for falling. The SMILING project is planning to diminish age related impairments by interfering with mobility disability and improving carry-over into real life situations.

## **SOCIONICAL**

### **Complex socio-technical system in ambient intelligence**

Budget: € 7.169.741 February 1, 2009 Duration: 48 Months

SOCIONICAL starts by looking at three types of interactions among individual entities ("in the small"): (i) the (possibly ICT enabled) interaction among humans, (ii) the interaction among humans and digital artefacts (ICT components/services, devices, gadgets, "smart things"...), (iii) the interaction among digital artefacts themselves (based on self-management capabilities, spontaneous and opportunistic interaction, etc.

## **SRS**

### **Multi-Role Shadow Robotic System for Independent Living**

Budget: € 5.149.095 Starting Date: February 1, 2010 Duration: 36 Months

The project focuses on the development and prototyping of remotely-controlled, semi-autonomous robotic solutions in domestic environments to support elderly people.

## **TOBI**

### **Tools for brain-computer interaction**

Budget: € 11.908.419 Starting Date: November 1, 2008 Duration: 51 Months

TOBI will design non-invasive BCI prototypes that will be combined with existing assistive technologies and rehabilitation protocols. In such a hybrid approach users can couple brain interaction with muscle-based interaction or can naturally switch between the different ways of interacting.

## **UniversAAL**

### **UNIVERSal open platform and reference Specification for Ambient Assisted Living**

Budget: € 13.980.164 Starting Date: February 1, 2010 Duration: 48 Months

UniversAAL aims to produce an open platform that provides a standardized approach making it technically feasible and economically viable to develop AAL solutions. The platform will be produced by a mixture of new development and consolidation of state-of-art results from existing initiatives.

UniversAAL will establish a store providing plug-and-play AAL applications and services that support multiple execution platforms and can be deployed to various devices and users. Finally the allocation of local human resources is also supported in the store.

The project Work on establishing and running a sustainable community will receive attention right from the start, with promotion of existing results gradually evolving into promotion of the universAAL platform, as it develops into one consolidated, validated and standardized European open AAL platform.

## **USEFIL**

### **Unobtrusive Smart Environments for Independent Living**

Budget: € 4.628.909 Starting Date: November 1, 2011 Duration: 36 Months

The USEFIL project aims to address the gap between technological research advances and the practical needs of elderly people by developing advanced but affordable in-home unobtrusive monitoring and web communication solutions.

## **VAALID**

### **Accessibility and usability validation framework for AAL interaction design process**

Budget: € 3.734.172 Starting Date: May 1, 2008 Duration: 30 Months

VAALID project aims at creating new guitar tools and teaching methods that facilitate and streamline the process of creation, design, construction and deployment of musical education solutions in the context of Ambient Assisted Living (AAL) assuring that they are accessible and usable for senior citizens.

## **VM**

### **Vital mind**

Budget: € 3.894.416 Starting Date: January 1, 2008 Duration: 36 Months

Cognitive decline in aging people can often be accompanied by mental, physical and social hardship. Cognitive training and, in particular computerized training in executive functioning, memory and speed of processing is associated with prolonging personal autonomy in these three life domains. However, many among the elderly are computer illiterate, and cannot benefit from the growing number of computer programs designed to train cognition. Instead, the elderly resort to television viewing, known to have adverse cognitive effects on aging.

## **WIISEL**

### **Wireless Insole for Independent & Safe Elderly Living**

Budget: € 3.900.000 Starting Date: November 7, 2011 Duration: 36 Months

The main goal of WIISEL is to develop a flexible research tool to collect and analyse gait data from real users and correlate parameters related with the risk of falls from the elderly population.

### 3.2.2 Summary table of selected projects of 7th Framework programme

Project	Starting Date Duration	Total budget	D/E	Topic	Target	Technology	M€	More tech information
<b>3D-LIVE</b> 3D Living Interactions through Visual Environments	September 1, 2012 24 Months	€ 1.737.000	D/E	Socialize	Support for Real time immersive situations	Augmented reality	1,7	
<b>3DTVS</b> 3DTV Content Search	November 1, 2011 24 Months	€ 3.517.000	D/E	Daily help	Search and browsing 3D contents on TV	Special devices	3,5	
<b>AALIANCE</b> European ambient assisted living innovation alliance	January 1, 2008 26 Months	€ 1.657.000	E	Interoperability between platforms and languages	Support framework for services	Special devices	1,6	
<b>ACCESSIBLE</b> Accessibility assessment simulation environment for new applications design and development	September 1, 2008 41 Months	€ 3.571.000	D/E	Daily help	Web accessibility	Special devices	3,6	Web services, ontologies

<b>Project</b>	<b>Starting Date Duration</b>	<b>Total budget</b>	<b>D/E</b>	<b>Topic</b>	<b>Target</b>	<b>Technology</b>	<b>M€</b>	<b>More tech information</b>
<b>ACCOMPANY</b> Acceptable robotiCs COMPanions for AgeiNg Years	October 1, 2011 36 Months	€ 4.825.000	E	Daily help	Physical, cognitive and social assistance	Robot	4,8	
<b>ALFRED</b> Personal Interactive Assistant for Independent Living and Active Ageing	October 1, 2013 36 Months	€ 4.440.000	E	Daily help	Wellbeing	Special devices	4,4	Android smartphones
<b>ALLOW Ensembles</b> Adaptable Pervasive Flows	February 1, 2013 36 Months	€ 3 893 424	E	Interoperability between platform and languages	Integrated urban mobility and smart production chains	Special devices	3,9	
<b>ALTEREGO</b> Enhancing Social Interaction with an AlterEgo Artificial Agent	February 1, 2013 36 Months	€ 3.834.000	E	Specific diseases	Social disorders	Robot	3,8	
<b>ARGUS</b> Assisting peRsonal GUidance System for people with visual impairment	October 1, 2011 30 Months	€ 2.638.000	D/E	Safe mobility	Impaired visually	Special devices	2,6	Satellite based navigation (GNSS/ EDAS) terminal
<b>BRAID</b> Aiding SuStainable Independent Senior TrAvellers to Navigate in Towns	March 1, 2010 28 Months	€ 1.200.000	E	Safe mobility	well-being and socio- economic integration	Special devices	1,2	

<b>Project</b>	<b>Starting Date Duration</b>	<b>Total budget</b>	<b>D/E</b>	<b>Topic</b>	<b>Target</b>	<b>Technology</b>	<b>M€</b>	<b>More tech information</b>
<b>BRAIN</b> BCIs with rapid automated interfaces for nonexperts	September 1, 2008 40 Months	€ 4.063.000	D/E	Health	Emulation	Special devices	4,1	
<b>C-SPACE</b> An affordable tool to turn the space surrounding us into a creative experience	November 1, 2013 30 Months	€ 2.928.000	D/E	Safe mobility	cultural	Augmented reality	2,9	4D scenes
<b>CAPSIL</b> International support of a common awareness and knowledge platform for studying and enabling independent living	January 7, 2008 24 Months	€ 786.000	E	Daily help	Independent living recommendations	Web based social network	0,8	
<b>COMPANIONABLE</b> Integrated cognitive assistive and domotic companion robotic systems for ability and security	January 1, 2012 54 Months	€ 10.715.000	D/E	Socialize	Social inclusion and homecare of persons suffering from chronic cognitive disabilities	Robot	10,7	
<b>CONFIDENCE</b> Ubiquitous care system to support independent living	February 1, 2008 36 Months	€ 4.659.000	E	Safe mobility	Fall detection	Special devices	4,6	

<b>Project</b>	<b>Starting Date Duration</b>	<b>Total budget</b>	<b>D/E</b>	<b>Topic</b>	<b>Target</b>	<b>Technology</b>	<b>M€</b>	<b>More tech information</b>
<b>CYBEREMOTIONS</b> Collective emotions in cyberspace	February 1, 2009 48 Months	€ 4.636.660	D/E	Wellbeing	Capture emotional states	Web-based social network	4,6	
<b>DALI</b>	January 1, 1996 18 Months	€ 4.418.900	E	Wellbeing	Services in towns and cities	Special devices	4,4	
<b>EHEALTHMONITOR</b> Intelligent Knowledge Platform for Personal Health Monitoring Services	December 1, 2011 36 Months	€ 4.078.283	E	Health	Monitoring Health system	Health sensors	4,1	SOA; reasoning
<b>EPAL</b> Extending professional active life	February 1, 2008 24 Months	€ 1.120.127	E	Socialize	Contribution of elderly expertise	Special devices	1,1	
<b>FLORENCE</b> Multi Purpose Mobile Robot for Ambient Assisted Living	February 1, 2010 36 Months	€ 5.635.657	E	Wellbeing	Elderly independent	Robot	5,6	
<b>GIRAFF+</b> Combing social interaction and long term monitoring for promoting independent living	January 1, 2012 24 Months	€ 4.038.575	E	Health; Socialize	Monitoring Health system	Health sensors	4,0	Sensors; speakers and microphone for social contacts

<b>Project</b>	<b>Starting Date Duration</b>	<b>Total budget</b>	<b>D/E</b>	<b>Topic</b>	<b>Target</b>	<b>Technology</b>	<b>M€</b>	<b>More tech information</b>
<b>HAIVISIO</b> Enhanced visibility and awareness in eHealth, Active Ageing and Independent Living projects	November 1, 2013 24 Months	€ 416.652	E	Health	Active Ageing and Independent Living projects	Web-based social network	0,4	
<b>HERMES</b> Cognitive care and guidance for active aging	January 1, 2008 24 Months	€ 4.193.355	E	Daily help	Cognitive care and support	Special devices	4,2	
<b>MARE</b> Market requirements, barriers and cost-benefit aspects of assistive technologies	September 1, 2008 18 Months	€ 698.560	E	Daily help	Analysis of Assistant technologies	Special devices	0,7	
<b>MIRACULOUS-LIFE</b> Miraculous-Life for Elderly Independent Living	December 1, 2013 36 Months	€ 4.195.276	E	Wellbeing	Emotional understanding and appropriate respond exhibiting distinctive emotions	Special devices	4,2	Facial expressions; voice intonation; gestures and other contextual information of the user's environment; Avatar
<b>MOBISERV</b> An integrated intelligent home environment for the provision of health, nutrition and mobility services to the elderly	December 1, 2009 44 Months	€ 3.600.742	E	Wellbeing	Wellbeing; Safety; Personal intelligent platform; middleware; services	Robot; Health sensors; Smart environment	3,6	



<b>Project</b>	<b>Starting Date Duration</b>	<b>Total budget</b>	<b>D/E</b>	<b>Topic</b>	<b>Target</b>	<b>Technology</b>	<b>M€</b>	<b>More tech information</b>
<b>OASIS</b> Open architecture for accessible services integration and standardisation	January 1, 2008 36 Months	€ 12.232.272	E	Interoperability between platforms and languages	Interoperability among services and ontologies	Special devices	12,2	
<b>PRESIOUS</b> PREdictive digitization, reStoration and degradatiOn assessment of cultUral heritage objectS	February 1, 2013 36 Months	€ 3.597.408	D/E	Health	Wellbeing	Sensor network	3,6	
<b>SENIOR</b> Social ethical and privacy needs in ICT for older people: A dialogue roadmap	January 1, 2008 24 Months	€ 1.333.098	E	Daily help	Systematic assessment of the social, ethical, and privacy issues; Protect senior citizens from misuse and abuse of ICT	Special devices	1,3	
<b>SMILING</b> Self mobility improvement in the elderly by counteracting falls	January 1, 2008 18 Months	€ 2.868.050	D/E	Safe mobility	Wearable non-invasive computer-controlled system to walk safely	Special devices	2,9	
<b>SOCIONICAL</b> Complex socio-technical system in ambient intelligence	February 1, 2009 48 Months	€ 7.169.741	D/E	Socialize	Communication	Special devices	7,2	
<b>SRS</b> Multi-Role Shadow Robotic System for Independent Living	February 1, 2010 36 Months	€ 5.149.095	E	Daily help	Wellbeing	Robot	5,1	

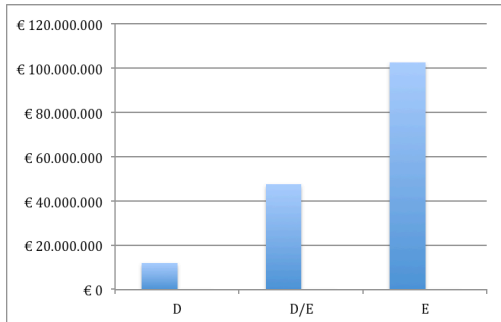
<b>Project</b>	<b>Starting Date Duration</b>	<b>Total budget</b>	<b>D/E</b>	<b>Topic</b>	<b>Target</b>	<b>Technology</b>	<b>M€</b>	<b>More tech information</b>
<b>TOBI</b> Tools for brain-computer interaction	November 1, 2008 51 Months	€ 11.908.419	D	Health	Rehabilitation	Special devices	11,9	
<b>UniversAAL</b> UNIVERSal open platform and reference Specification for Ambient Assisted Living	February 1, 2010 48 Months	€ 13.980.164	E	Daily help	Community building and standardization	Special devices	14,0	
<b>USEFIL</b> Unobtrusive Smart Environments for Independent Living	November 1, 2011 36 Months	€ 4.628.909	E	Daily help	Monitoring Health system	Smart environment	4,6	
<b>VAALID</b> Accessibility and usability validation framework for AAL interaction design process	May 1, 2008 30 Months	€ 3.734.172	E	Socialize & virtual exercising	Music education	Special devices	3,7	
<b>VM</b> Vital mind	January 1, 2008 36 Months	€ 3.894.416	E	Measure mental (and motor) abilities	Cognitive decline	Special devices	3,9	
<b>WIISEL</b> Wireless Insole for Independent & Safe Elderly Living	November 7, 2011 36 Months	€ 3.900.000	E	Safety	Flexible software and wearable insole device	Health sensors	3,9	

Table 3.2.2-1: Summary table of selected projects of 7<sup>th</sup> Framework programme

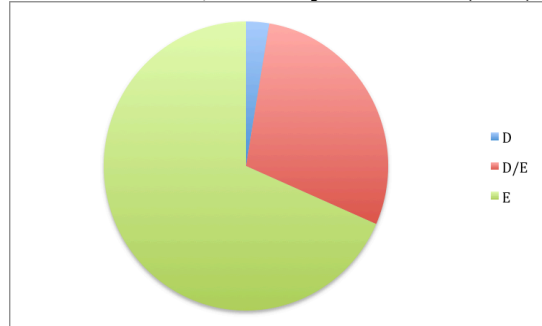
### 3.2.3 Considerations on selected projects of 7th Framework programme

The number of projects selected was 38 and the average cost of selected projects is about 2.5 million of euros.

Partition of the projects based on the parameter “Disabled”, “Elderly” or “both (D/E)”



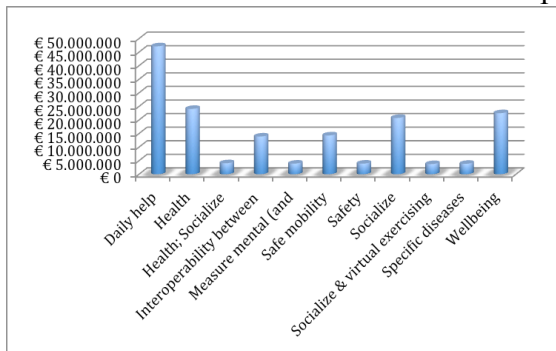
Graphic 3.2.3-1: Budget divided by D, E, D/E



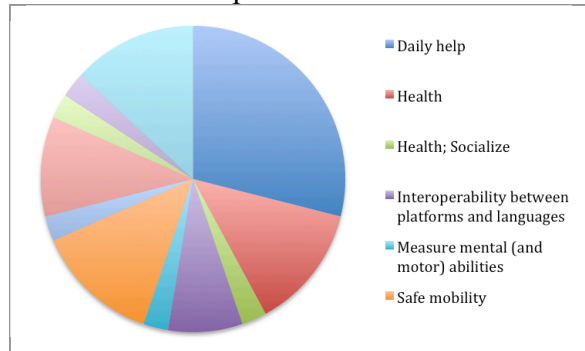
Graphic 2.2.3-2: Num. of projects divided by D, E, D/E

The following graphs indicate that many topical FP7 have been the subject of research with a preference to "Daily help" and those relating to health as "Health" and "Wellbeing." Even a relevant investment has been made for the social life ("Socialize").

Partition of the projects based on the topic



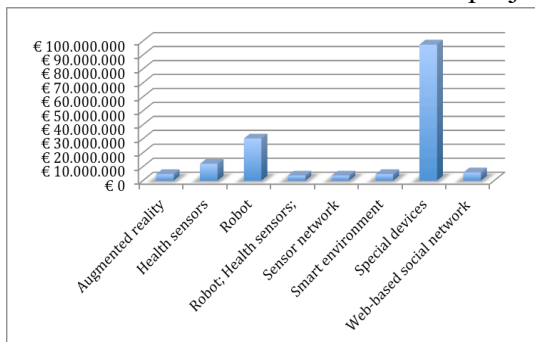
Graphic 3.2.3-3: Budget divided by topic



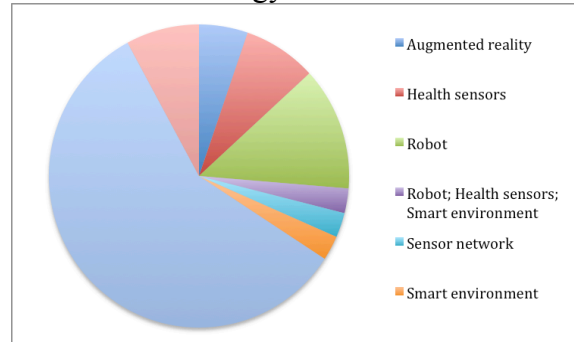
Graphic 2.5.3-4: Num. of projects divided by topic

The following graphics show the technology used in the FP7 projects selected. In this programme has given much importance to advanced technology (“special devices ”, " Robot ") while solutions that provide welfare services or traditional assistants were not adopted because it is assumed that these are best handled within the AAL.

Partition of the projects based on the technology used

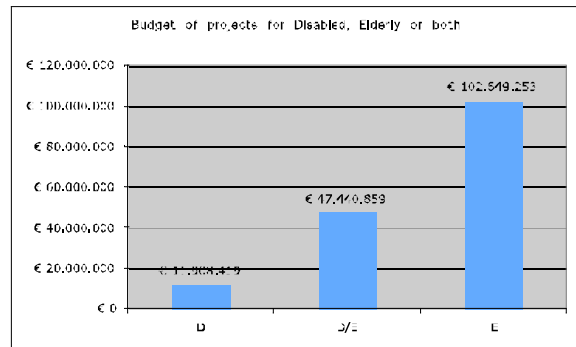
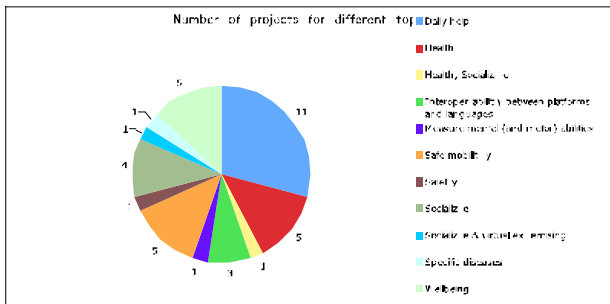
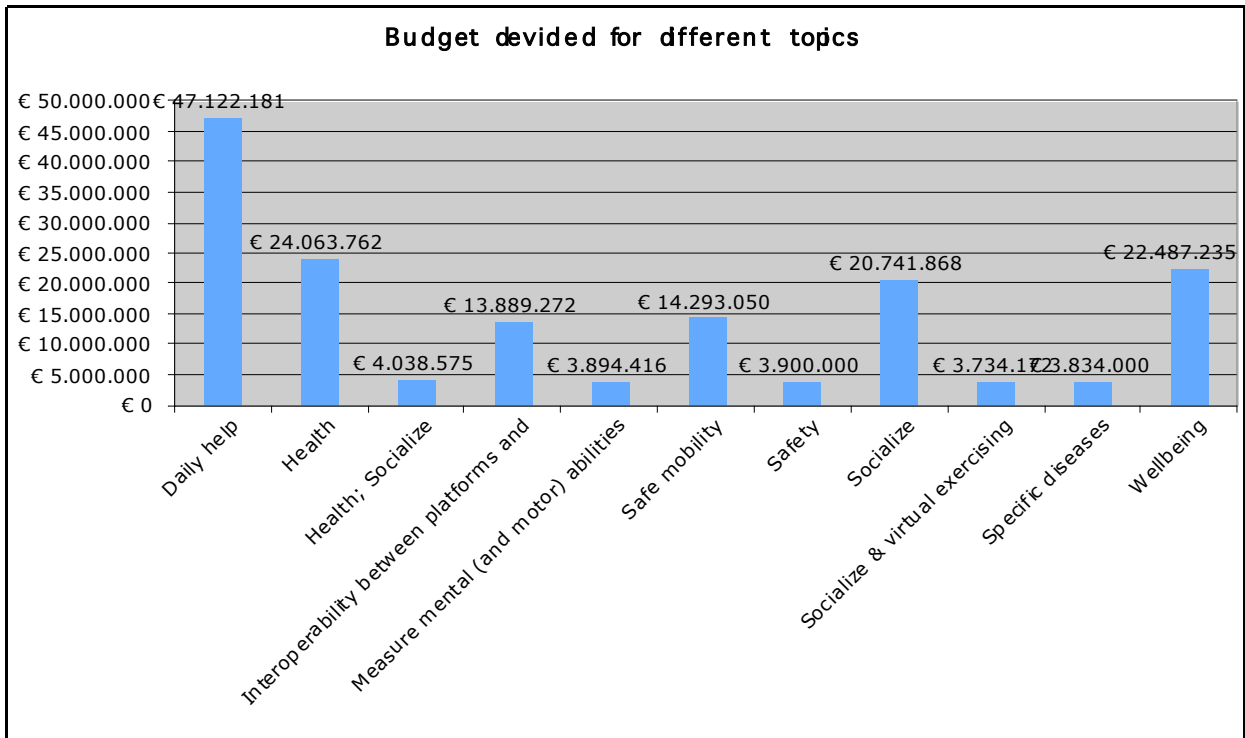


Graphic 3.2.3-5: Budget divided by technology used



Graphic 2.5.3-6: breakdown by technology

## Other graphics



## 4 Conclusions

From an examination of all the projects in the program ICT for aging well (AAL) we can deduce that many efforts have been made to allow or at least facilitate communication between elderly people, but each project has its own vision and has the same goals: help elderly people and prepare Europe in consideration then in the future the number of elderly will be increased. Many ideas and solutions to problems of the elderly that we have listed in this selection of projects can suggest other new ideas or variations of ideas already taken into account that can enrich what already has been done.

<b>Mean cost of AAL projects</b>	<b>#</b>	<b>Average €</b>	<b>Total investment €</b>
AAL Call 1	23	€ 2.925.367	€ 67.283.449
AAL Call 2	32	€ 2.601.722	€ 83.255.108
AAL Call 3	22	€ 2.539.959	€ 55.879.105
AAL Call 4	25	€ 2.438.831	€ 60.970.778
AAL Call 5	17	€ 2.574.910	€ 41.198.564
<b>Overall</b>	<b>119</b>	<b>€ 2.585.865</b>	<b>€ 308.587.004</b>

<b>Mean cost of selected FP7 projects</b>	<b>#</b>	<b>Average €</b>	<b>Total investment €</b>
	38	€ 4.263.119	€ 161.998.531

*Table 4-1: Average and total cost of the chosen programmes*

Investment for Technology	AAL										AAL TOTAL	
	Call 1		Call 2		Call 3		Call 4		Call 5		#	€
	#	€	#	€	#	€	#	€	#	€		
Artificial Intelligence	1	€ 1.205.833					1	€ 3.170.229	2	€ 6.517.319	4	€ 10.893.381
Augmented Reality					1	€ 2.543.314					1	€ 2.543.314
Creating services			1	€ 3.670.000							1	€ 3.670.000
Database			1	€ 1.527.639							1	€ 1.527.639
Digital communication			1	€ 1.492.120							1	€ 1.492.120
Exergames			1	€ 3.670.000							1	€ 3.670.000
Health sensors					1	€ 2.162.987					1	€ 2.162.987
Measure mental (and motor) abilities			1	€ 1.527.639							1	€ 1.527.639
Multilingual access point/interface			3	€ 1.492.120							3	€ 1.492.120
Robot	1	€ 2.400.000	2	€ 3.033.000			1	€ 4.559.117	1	€ 2.360.000	5	€ 12.352.117
Sensor Networks	4	€ 12.101.381	1	€ 2.100.000					3	€ 9.416.153	8	€ 23.617.534
Sensors for health monitoring	9	€ 34.912.068									9	€ 34.912.068
set-top box			1	€ 10.145.029							1	€ 10.145.029
Smart environment	3	€ 5.626.685					2	€ 1.478.093			5	€ 7.104.778
Smart environment / A.I.							1	€ 1.797.253			1	€ 1.797.253
Social network			4	€ 6.875.776							4	€ 6.875.776
Social network & mobile technologies			1	€ 3.416.850							1	€ 3.416.850
Software			10	€ 1.784.340							10	€ 1.784.340
Software - game			1	€ 12.430.507							1	€ 12.430.507
Special devices	3	€ 5.111.110			19	€ 47.325.032	16	€ 41.593.955	7	€ 18.582.419	45	€ 112.612.516
TV			1	€ 2.400.000							1	€ 2.400.000
TV - Social network			3	€ 20.803.632							3	€ 20.803.632
Unknown							1	€ 1.934.259			1	€ 1.934.259
Virtual Reality	1	€ 2.291.001									1	€ 2.291.001
Web-based social networks	1	€ 3.635.371			1	€ 3.847.772	3	€ 6.437.872	4	€ 4.322.673	9	€ 18.243.688
<b>TOTAL</b>	<b>23</b>	<b>€ 67.283.449</b>	<b>32</b>	<b>€ 76.368.652</b>	<b>22</b>	<b>€ 55.879.105</b>	<b>25</b>	<b>€ 60.970.778</b>	<b>17</b>	<b>€ 41.198.564</b>	<b>119</b>	<b>€ 301.700.548</b>

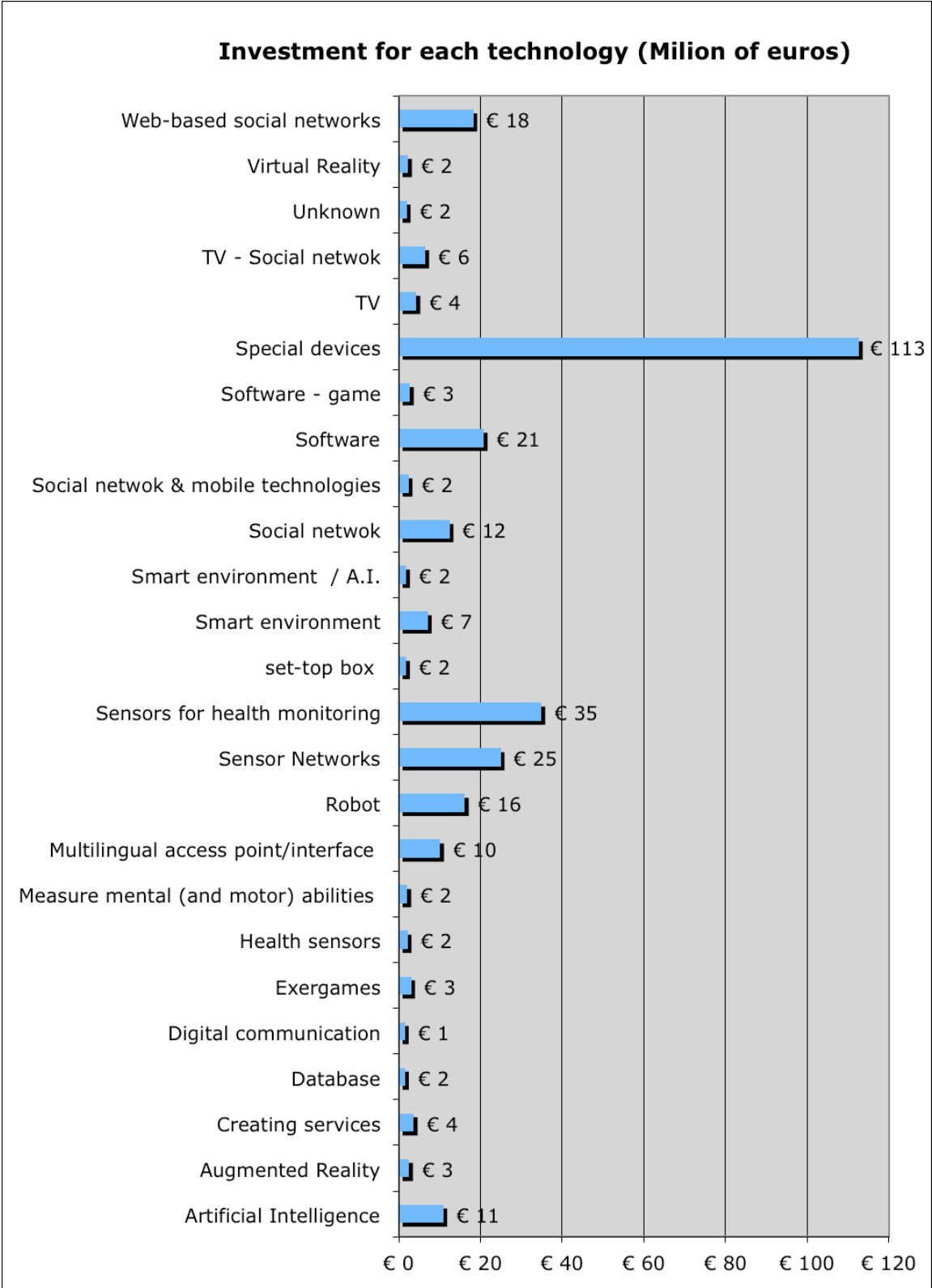
Table 4-2: Summary table of the investment for AAL divided by technology

In the table above and the following Graphics we can see that more than a third of the projects are geared towards the realization of new devices.

Among other technologies, much has been spent to create or optimize the use of sensors and to setup social networks. Other technologies were distributed fairly evenly.

TOPIC	AAL										AAL TOTAL	
	Call 1		Call 2		Call 3		Call 4		Call 5		#	€
	#	€	#	€	#	€	#	€	#	€		
Daily help					13	€ 32.381.142	5	€ 10.710.672	8	€ 19.903.480	26	€ 62.995.294
Elderly help	5	€ 10.798.614									5	€ 10.798.614
Elderly safety	8	€ 23.078.566									8	€ 23.078.566
Health					1	€ 2.345.104					1	€ 2.345.104
Interoperability between platforms and languages									1		1	
Measure & monitor			3	€ 9.186.850							3	€ 9.186.850
Measure mental (and motor) abilities									1	€ 2.604.926	1	€ 2.604.926
Safe mobility					5	€ 11.813.415	14	€ 31.489.832	1	€ 4.155.944	20	€ 47.459.191
Safety							2	€ 7.370.331	1	€ 2.380.199	3	€ 9.750.530
Socialize			28	€ 72.222.675	2	€ 5.431.562					30	€ 77.654.237
Specific diseases	10	€ 33.406.269	1	€ 1.845.583					2	€ 4.353.477	13	€ 39.605.329
Unknown							1	€ 1.934.259			1	€ 1.934.259
Wellbeing					1	€ 3.907.881	3	€ 9.465.684	3	€ 7.800.538	7	€ 21.174.103
<b>TOTAL</b>	<b>23</b>	<b>€ 67.283.449</b>	<b>32</b>	<b>€ 83.255.108</b>	<b>22</b>	<b>€ 55.879.105</b>	<b>25</b>	<b>€ 60.970.778</b>	<b>17</b>	<b>€ 41.198.564</b>	<b>119</b>	<b>€ 308.587.004</b>

Table 4-3: Summary table of the investment for AAL divided by topic



Graphic 4-2: Investment for AAL divided by technology



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