D 1.2 – List of selected functions

Project acronym:	ALIAS
Project name:	Adaptable Ambient Living Assistant
Strategic Objective:	ICT based solutions for Advancement of Social Interaction of Elderly People
Project number:	AAL-2009-2-049
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Co-ordinator:	Prof. Dr. Frank Wallhoff
Partners:	Technische Universität München Technische Universität Ilmenau Metralabs GmbH Cognesys GmbH EURECOM Guger Technologies Fraunhofer Gesellschaft pme Familienservice YOUSE GbR

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D 1.2

Version:	1.00
Date:	2011-02-20
Authors:	Sandra Niedermeier Katharina Scheibl Wolfram Schneider Susanne Ihsen Felicitas Kohl Petra Dinckelacker Sebastian Glende Raphael Troncy

Once completed please e-mail to WP leader with a copy to eric.bourguignon@tum.de and frank@wallhoff.de.

Del 1.1	Executive Summary
List of selected functions (depending on completion of concepts by other partners), based on the feedback from partners regarding technical feasibility + user needs (from march on: Catalog of requirements prototype)	

Dissemination Level of this deliverable (*Source: Alias Technical Annex p20 & 22***)**	
PU	Public
Nature of this deliverable (*Source: Alias Technical Annex p20 & 22***)**	
R	Report *Even a demonstrator or a prototype shall be accompanied with a report, or which basic structure is explained on page 3.*

Due date of deliverable	20/02/2011
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	Short review with minor changes and release	YOUSE	21/04/2011
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Table of Content

1 Abstract

This deliverable describes the inclusion of users and contains activities from WP1 including the activities of partners to get an overview of progress in the process of user inclusion, of the evaluation of the requirements from primary analysis and the list of selected functions.

In addition some demo use cases are mentioned to give users an idea how ALIAS acts and what should be possible. Facts from the advanced secondary analysis are given and results of a workshop with relatives and caregivers are discussed. The aim of the workshop was the analysis of everyday activities and support opportunities by a domestic robot, a definition of general requirements of the target group, the identification of relevant requirements and wishes regarding a robot and a selection and short description of favored functions.

The current draft describes a list of selected functions depending on completion of concepts by other partners. The summarized results of the first YOUSE workshop from 30/9/2010 were complemented by the results of the pme-workshop on 10/11/2010 and another short YOUSE workshop on 13/10/2010. All added ideas, additions or requirements of the elderly, informal and professional caregivers were added to a Google-Spreadsheet. All partners gave a feedback on it: https://spreadsheets.google.com/ccc?key=0Aqjdjsf_JHg5dHFfYmtSeDBkb1RrQ2QtbFVJRElCSnc&hl=en&pli=1#gid=0

A shorter list of feasible functions is on the MediaWiki. All these functions were clarified at the Technical Meeting in Berlin on 27/1/2011. The list contains the names of the responsible partners: http://wiki.aal-alias.eu/alias-wiki/index.php/List_of_-functions

Keywords: User inclusion, selected functions, workshop results, use cases

2 Introduction and Purpose of the Deliverable

The work described here refers to D1.2 in the timeline from WP1 lead by TUM-GSING. The overall goal of this is a list of selected functions (depending on completion of concepts by other partners). The following task 1.4 comprises the feedback from partners regarding technical feasibility and user needs that lead to a catalog of requirements for the prototype, which selects the most adequate functions/concepts: From the large set of needs and preferences of elderly people towards the ALIAS robot platform, a subset will be selected to meet the users` needs in optimal manner and additionally reduce the complexity of controlling the ALIAS platform by elderly people.

Furthermore D1.2 describes use cases for the pilot (WP7) and empirical results from the pme Familienservice and YOUSE workshops.

To fulfill these options the participation of users should be ensured at a very early stage for the following reasons:

- We should know the environmental conditions for the use of the robot.
- ALIAS should be equipped with useful features for the target groups.
- ALIAS is well designed to operate.
- ALIAS receives an attractive appearance.
- ALIAS gets a user manual which is easy to understand.
- Therefore regular contact with the technical staff of the project is necessary to optimize the features of ALIAS step by step.

The work of user inclusion is divided into three parts:

1. **Requirements definition for the robot**
   - Analysis of everyday activities and possible help functions by the robot
   - Definition of the specific requirements of target groups
   - Identification and definition of relevant requirements and preferences of the users
   - Selection and description of the desired functions

That is the actual status of our work.

2. **Test of the robot**
   - Iterative testing of the user reviews of existing prototypes
   - Testing the usability and functionality of ALIAS
   - Derivation of recommendations for improvements if possible
   - Testing the second prototype and the associated approximation stage to a market-age robot

3. Development of requirements and testing of implementations for the users

It is the aim to develop a robot that is easy to use and to fulfill important requirements of the target groups. The project proceeds on a step-by-step basis.

3 Identification and Systematisation of user needs and functions

3.1 Methodical Approach

Our methodical approach includes four branches:

- Workshops with elderly
- Workshops with (professional) caregivers and family members
- Secondary analysis
- Informational sessions with different target groups

To realize a highest possible integration and interaction with the users, workshops are used in this project. Workshops as a method for user-inclusion are especially suitable in this context, because in work with small groups a direct interaction and the need to cooperate are in center. Workshops therefore are characterized by personal interaction and enable both implicit and explicit knowledge exchange. They are based on theory and methodology of action research (mainly Lewin 1948, 1952) and other elements of qualitative social research (Flick et.al. 1995). The methods used are similar to those practitioners appropriate in their all-day-work for quality measurements, such as monitoring or discussions. The idea is that the more open, complex and risky a society and its subsystems are the more necessary for each member is a continuously self-assuredness along own actions and moral concepts. The main goals of action research are knowledge *and* development (Altrichter & Posch, 2007). Therefore there are a lot of methods normally used to get a mixture of controllability and the independence of the user-action, which is essential for a “real” product innovation (Wecht 2005). Two creative techniques used regularly in our workshops are:

- Brainwriting: Aims on the identification of general requirements and everyday tasks that can be supported by a robot. Brainwriting is a creativity technique used for idea generation. It allows to develop innovative, qualitative results and can be used in the field of product as well as service design. It is a very easy method and takes about 30 to 60 Minutes, depending on tasks and size of involved user groups.

- Walt-Disney-Method: Aims on the identification of creative and at the same time realistic ideas for products and services. The Walt-Disney-Method is a creativity technique used for idea generation. It allows to develop innovative and realistic, qualitative results and can be used in the field of product as well as service design. It is a method of medium difficulty and takes about 30 to 120 Minutes, depending on tasks and size of involved user groups.

These workshop activities are accompanied by questionnaires, interviews and secondary research and market analysis to get the workshop results comparable (Flick et.al. 1995).

3.2 Activities

3.2.1 Use Cases

The project partners developed four scenarios which describe application areas of ALIAS and can be used as testing modules in a later phase of the project. Typical services of the robot are making phone calls, playing video games, monitoring physiological functions and buying e-tickets.

3.2.1.1 Contact with family – Phone call scenario

The user Hans wants to call his grandson Bob. So ALIAS gets a speech input from the user: "Call my grandson Bob ". The speaker recognition module of ALIAS identifies the user and understands the request. Alias dials the phone number of the member, but Bob does not want to answer within normal ringing time. Only his phone responder is on. Alias leaves a message on the responder: “Hans was calling. He would try again later”. Alias tells the user that nobody picks up the telephone after the call. He asks if he should try to call Bob later “No one’s picking up. Should I call later?” Hans says “Yes”. Then Alias moves back and the user sits down in his chair.

Alias tries to call Bob again half an hour later. But the phone is busy now. Alias hangs up and tells the user that Bob is busy on his phone: “Bob is busy. Should I tell you when he has time?” The user says: “Yes”. After ten minutes, the robot moves to the user and let the image of the member lights up with his phone number. The robot let now the user knows that the telephone of the member is no longer busy: “Bob is ready to phone” The user wants the robot to call again: “Call Bob” Alias dials the phone number, the image is blinking up and Bob is on the phone. Bob: “Bob is here, hi!”

The scenario was prepared by TUM-GSing.

3.2.1.2 The Games Scenario

The robot named „Cesar“ lives with his owner Werner in a small flat. Usually the robot stands on his charging station in the living room and awaits orders while the owner watches TV, reads a book or does other things inside the other rooms of the flat. Occasionally the owner wants to play a game with the help of the robot. Either he wants to play with other people or he wants to play alone. On these occasions he calls Cesar: “Come to me, Cesar!”. The robot travels near Werner and he has now the option to select between his favorite browser games or to put a game of his choice inside the playing console, mounted on the robot. So he can choose between a single player game and a multi-user game. Today Werner would love to play against his friend Franz online.

He starts the application by touching the screen and takes the so called “nunchuck” – which is attached to Cesar as well – to control the game (which is not possible via the touchscreen yet).

The game interface appears in full screen on the robots display. To detect the correct position of the Wii’s nunchuck controller, Werner once has to calibrate the system, since the position LED’s of the Wii are mounted on top of the screen. If he would have played a browser game, a calibration would not have to be done. Unfortunately, Franz seems to have left the game before they could really start – how weird.

Like the Wii, most games on Werners robot support their own connectivity platforms, so he can choose against whom he wants to play. He decides for a browser based round of chess against another person, which is online by chance. Other choices would be playing cards, play Mahjong or a round of Sudoku alone. His favorite Wii game is „Raving-Rabbits“, but this is only fun when his daughter is visiting him.

Suddenly a phone call of his daughter arrives. He has to pause the round of chess and tells the robot that he is now ready to answer the phone call. After finishing the call, he continues the round of chess (his opponent is still willing to do so, which is not always the case when playing against other people and the game was paused). When the game is finished (and unluckily he lost!) the robot notices that he is not needed at the moment and travels back to his usual resting position at the charging station.

The games scenario was elaborated by TUI.

3.2.1.3 Physiological Monitoring

General remarks/Hardware

The physiological data can be provided in a twofold way from a mobile recording system (e. g. g.tec g.MOBIlab+): first, UDP-based communication, second, data file on the hard disk. For online cases only UDP-based communication is applied, thus, the extent and the update rate of the physiological data is limited. In contrast to the online cases, the monitoring cases are basing on the physiological data stored in the data file. However if desired to keep the amount of data on the hard disk in reasonable way, a filtering function can be applied ensuring that only data files with conspicuous physiological values are recorded.

General remarks/Monitoring

Monitoring in the domain of vital functions can be seen as supervision of specific vital parameters, like: heart rate, respiration, blood pressure, blood sugar level, etc. The continuous observation of vital function can be used to recognize critical acute situations as well as changes (improvement, deterioration) over a longer time period.

Use Case: Diary Monitoring of Vital Functions

The average expectation of life was increasing steadily over the past decades. As a consequence the case numbers of age related diseases like diabetes, high blood pressure, etc. are increasing accordingly. If those diseases are not discovered in early stages, treated improperly or ignored by the affected patient they may cause secondary diseases and deficits like dysfunction of liver and kidneys, severe damage to eyes, heart attacks and stroke. To prevent these secondary diseases and to help the patients to better manage their, in many cases chronic, disease they are advised by their doctor to measure specific vital parameters, like blood pressure, heart rate, blood sugar level , etc. several times a day and use a dedicated personal diary to record them in chronological order. Based on this diary they can discuss with their doctor further strategies managing the disease, including specific exercises, medication, diet plan, etc. In case the elder person suffers from dementia, Alzheimer’s disease or forgets to record the vital parameter values the diary loses its value very quickly. A diary application in contrast to the paper note book based version, can remind the users to do the measurements, record the parameters for the user and transmitted them to the doctor for a remote consultation if requested by the user. Further the user has direct access to the content of the diary incorporated in the robotic platform.

The scenario of physical monitoring was developed by Guger in collaboration with TUM-MMK.

3.2.1.4 Scenario on e-tickets

User studies have shown that purchasing tickets for scheduled events such as music or theater is among the most frequent activities performed by elderlies on the web. The ALIAS robot will have a dedicated application for supporting this task, making the booking for a particular event even simpler. Furthermore, the application will enable the elderly to re-live past events they have attended with their family and relatives.

First, the event service embedded into the ALIAS robot will continuously monitor the scheduled events taking place in the geographical area surrounding the user. A search feature will also enable to find events at a given location (e.g. close by the house of the user's family or relatives).

Second, user preferences (based on past user attendance) and social networks (friends, family and relative interest) will be taken into account in order to proactively suggest upcoming event that could interest the user. This will have the effect of increasing the number of outings the elderly person does.

Third, once a particular event will be selected, the application will carefully display all relevant information about the event (location, time, description, ambiance, participants, costs) for supporting the user in deciding or not to attend the event. In case the user notifies an interest for going to an event, ALIAS will alert the user's social network and tries to plan the trip to the event. The alerting system will increase the chances for the elderly to meet others during that outing, thus reducing loneliness. As friends and relatives would purchase ticket, they would also think of proposing the elderly person to accompany them in return, further reducing loneliness.

The scenario presented here is rather conservative and could easily be turned in a more proactive one by automatically showing all those connected to a person about the fact that you are going to attend an event, some may consider attending as a result.

Technically, this scenario could be fully implemented using semantic web models for modeling events[1] and tickets[2].

The scenario was elaborated by EURECOM.

3.2.2 Workshop with Family Members

The results of the workshop at pme Familienservice, 10th of November 2010, Berlin, of relatives and professional care givers are described below. For the Workshop, the following schedule was given:

Table 1: Schedule of the workshop with family members

Time:	Procedure:
4.00pm to 4.25pm	Introduction of the ALIAS-project
4.25pm to 5.00pm	Brain writing (creative technique) aiming on the identification of general requirements and everyday tasks that can be supported by a robot
5.00pm to 5.15pm	Definition of demand categories
5.15pm to 5.30pm	Coffee break
5.30pm to 6.15pm	Discussion of the tasks and functions for ALIAS

[1] http://linkedevents.org/ontology/

[2] http://www.heppnetz.de/ontologies/tio/ns.html

6.15pm to 6.30pm	Finish. Answering of the questionnaire
from 6.30pm	Conclusion of the evening with a refreshment

There were 12 participants (informal and professional caregivers, consultants for eldercare), eleven of them female, one male, aged between nearly 28 and 80 years.

The workshop leaders were Petra Dinkelacker, Felicitas Kohl (pme Familienservice) and Dr. Sebastian Glende (YOUSE). The questionnaires used were prepared by Prof. Susanne Ihsen, Sandra Niedermeier and Katharina Scheibl (TUM GSING).

4 Results of User Inclusion Activities (follow up)

4.1 Results of the Workshop with Family Members

The following summary contains the results of the survey among family members at the last workshop at pme. Ten women and one man with an average age of 61 years took part; the youngest was 28, the oldest 79. One participant reported that he/she cares for two persons. The questionnaire includes questions about health and leisure, activities of elderly people and the robot functionalities.

Three quarters of the seniors have physical limitations. Senior is the name we use to describe elderly with various handicaps.

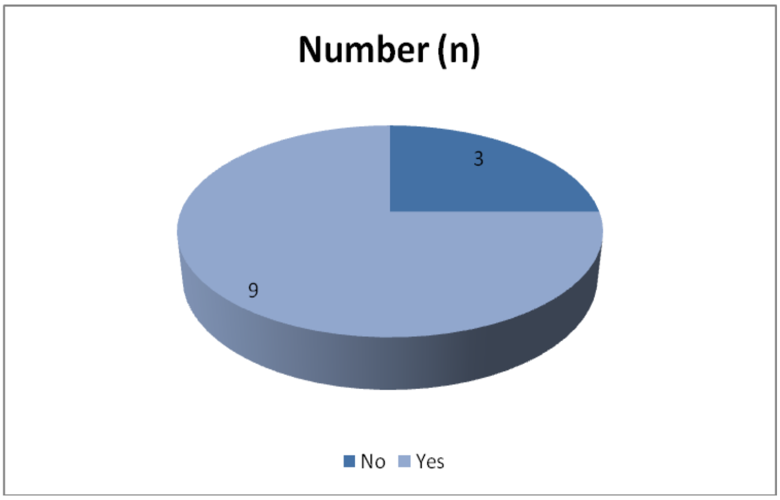

Figure 1: Does your family members have physical restrictions (such as hardness of hearing, diabetes mellitus, etc.)?"

Table 2: Type of physical limitations:

Diabetes, restriction in mobility, forgetfulness, depression
Hearing loss, severe restriction of movement, breathing
Severe disability 100% because of vision problems, unable to walk
Deafness, almost blind
Speech disturbance, mild dementia, Parkinson's
Osteoporosis
walking difficulties
Heart disease
Severe disability 70%, unable to walk

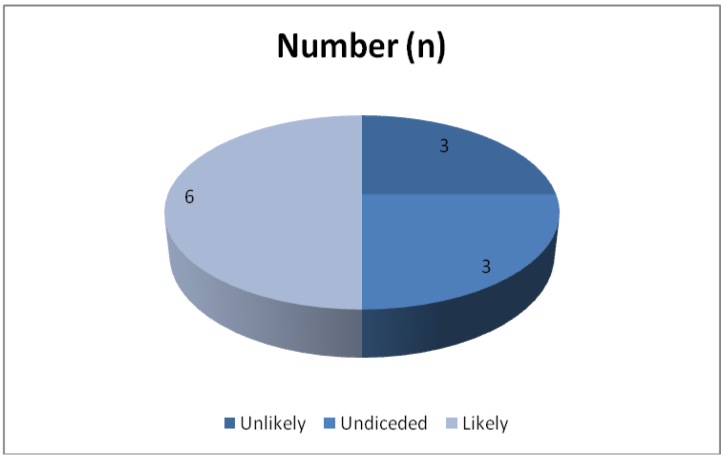

Figure 2: Does your family member make activities with friends, and family?

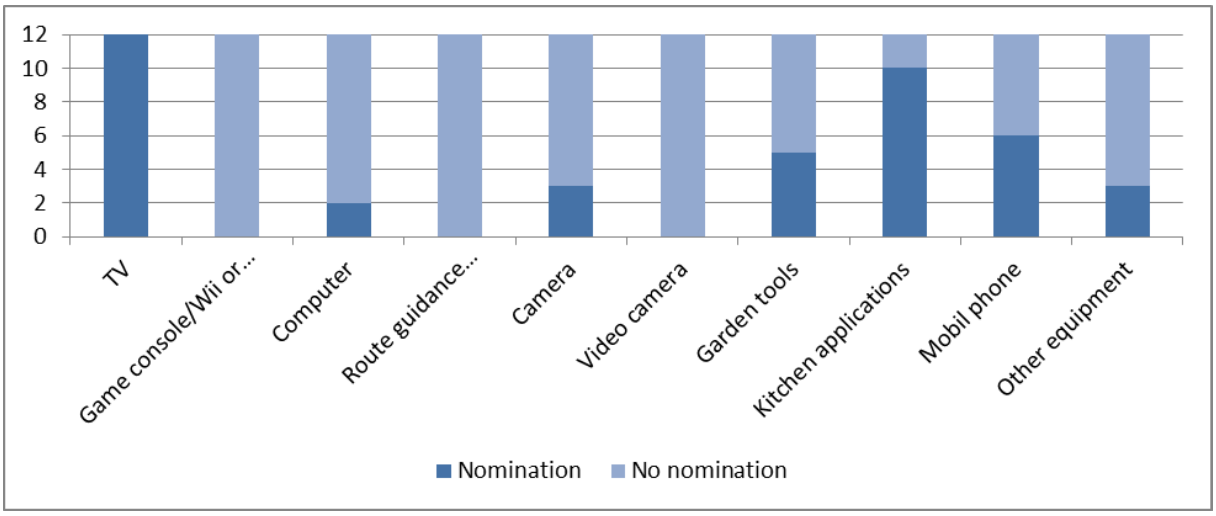

Figure 3: In everyday life, what technical devices use your family member? (multiple answers possible)

Table 3: Does your family members deal easily with technology?

	Number (n)
Not at all	3
Not	5
Rather not	3
Rather easily	1
Total	12

Table 4: Does your family member use the internet?

	Number (n)
Not at all	11
Rather not	1
Total	12

Table 5: Does your family member write e-mails?

	Number (n)
not at all	2
Rarely	1
Total	3

Table 6: If your family member is using the Internet, does he/she have experience with social networks (such as Facebook, Xing, etc.)?

	Number (n)
Yes	1
No	1
No response	10
Total	12

On the question "which social networks does your family member use" a participant answered that the senior uses the pages "Wer kennt wen?"[3].

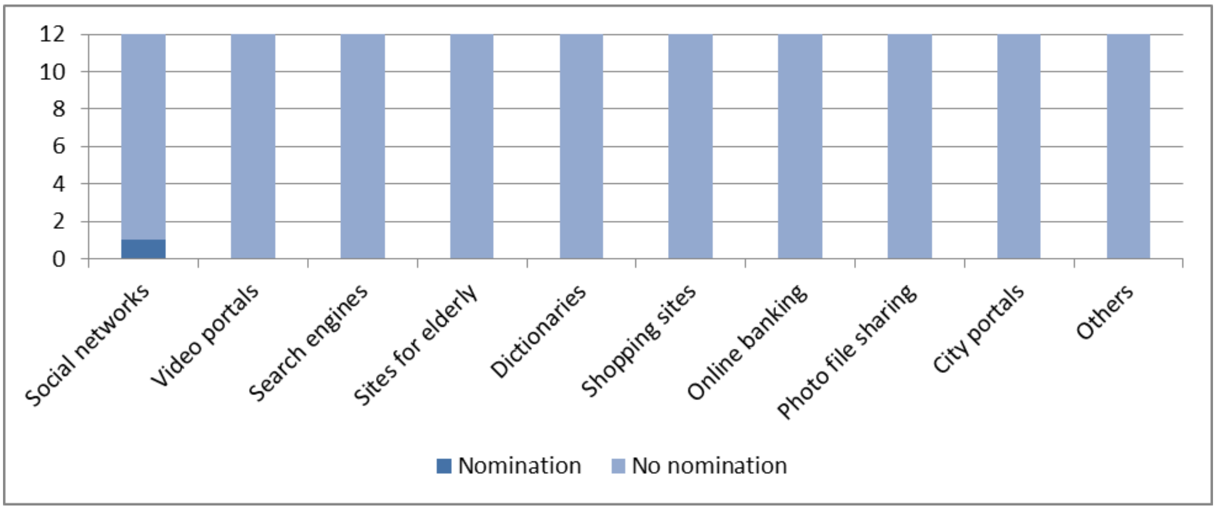

Figure 4: Which websites, portals and search engines does your family member use?

Table 7: Could you imagine that your family member will use platforms to communicate with friends and family in future (e.g. for the exchange of photos)?

	Number (n)
No	1
Yes	1
no response	10
Total	12

[3] Who knows whom? – http://www.wer-kennt-wen.de/

A participant of the workshop told us that he or she can imagine that his or her family member uses such a new technology to communicate with friends and relatives "if the technology is simple".

Table 8: Could you imagine that your family members will use a robot for assistance in everyday life (e.g. memorizing the medication)?

	Number (n)
Not at all	1
Not	3
Rather not	2
Rather	4
Easily	2
Total	12

Table 9: In your opinion, what should a robot be able to do (e.g. instructions for exercises for movement, the possibility of keeping in contact with you)?

Stable, reliable, kind appearance, makes contact (via internet/telephone) to friends, family members, physician e.g., offer games and information, evocative of pill taking, adapted to the needs of individuals, e.g. speak slowly
Phone calls, transmission of the doorbell, video, television, emergency call, radio
Communication with image, exercise guide, offers/memory eating, drinking, drug, e? Equipment, reading of mail
Emergency alert, assist in emergency aid / offer
Communication/contact e.g. over the phone, photos, videos, entertainment (movies, music, games)
Assistance in nursing
Communication with us and all other caregivers, neighbours etc., pill taking, open university?, exercise, emergency call function
Contact, suggestions for everyday life (read recipes), tell stories
Easy internet access for writing emails, finding information, handicraft instructions
Gesture control, speech, smoke detector + alarm, phone, e-mail, emergency notice, preferences are reminiscent of calendar entries
Video based communication, exercise guide, tips and reminders on eating, drinking, drug taking, equipment, reading of mail

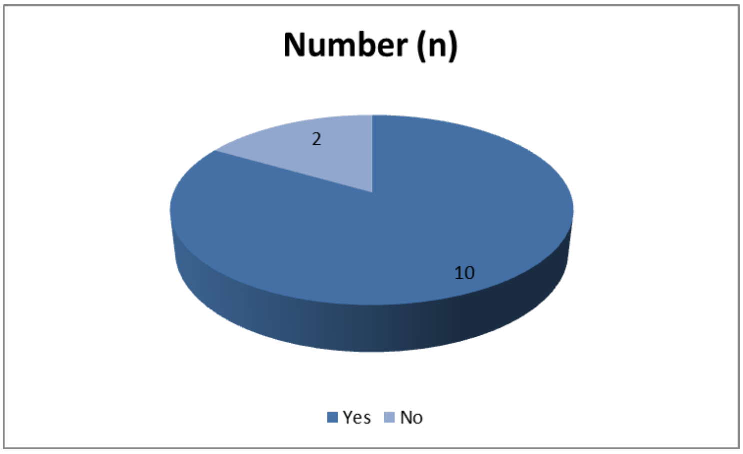

Figure 5: Could you imagine that your family member will use a video phone to stay in touch with you?

On the question "Could you imagine that your family member will use a video phone to stay in touch with you?" a participant of the workshop said "No, because: They do not necessarily want to be seen".

Table 10: Could you imagine that the health of your family member will be continuously recorded?

	Number (n)
Yes	7
No	4
Total	11

Table 11: Could you imagine that your family member will use an automatic transfer of the health status to the treating physician?

	Number (n)
Yes	9
No	3
Total	12

Table 12: Sex of the respondent:

	Number (n)
Female	10
Male	2
Total	12

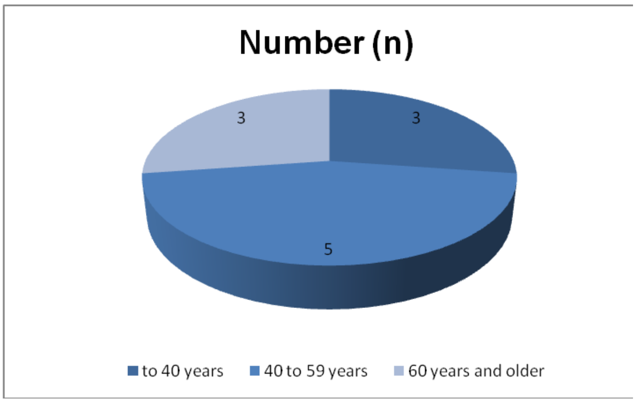

Figure 6: Age of the respondent

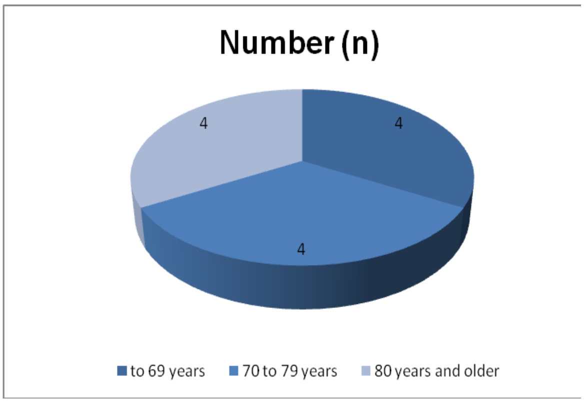

Figure 7: Age of the family member

Lesson learned: Also care givers, e. g. family members can be in the age of the target group, which means 60+ years.

Table 13: Sex of the family member:

	Number (n)
Female	11
Male	1
Total	12

Table 14: Living environment of the respondent:

	Number (n)
City/city area	11
Rural area	1
Total	12

Table 15: Living environment of the family member:

	Number (n)
City/city area	7
Rural area	5
Total	12

Table 16: Professional background of the respondent:

	Number (n)
Academic professions (e.g. Psychologist, Educationalist)	5
Non-academic professions (e.g. care giver, carpenters)	3
Other (employees)	2
Total	10

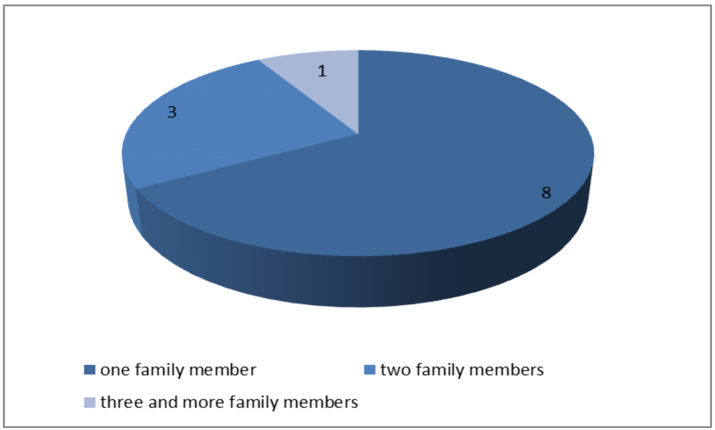

Figure 8: Number of supervised family members

4.2 Relevance of Results

The following table is the assessment of the relevance of each category represented by the elderly and the relatives or caregivers from the PME workshop.

Table 17: Relevance of results

Category	Relevance	
	requested by seniors	requested by relatives and (professional) caregivers
Secretary/Administration	⊕⊕	
Physical support	⊕	⊕
Device control and security	⊕	⊕
Healthy living and health status surveillance	⊕⊕	
Leisure and hobbies	∅	⊖
Communication	∅	⊕
Usability and design		∅
Legend: ⊕⊕ – very high, ⊕ – high, ∅ – average, ⊖ – low, ■ part of the workshop		

4.3 Findings for ALIAS by Presentation from Digital Television for All

Minutes of the technical-scientific colloquium organized by the Institute for Radio Technology:

Speakers: Werner Brückner (IRT), Bettina Heidkamp-Tchegloff (rbb), Martin Link (IRT)

Project Introduction DTV4ALL (digital television for all)

Funded by the EU Commission in the Agenda i2010 for ICT PSP (Information and Communication Technology – Policy Support Programme)

End of project: 1.1.2011

Project partner: Brunel University London, Danmarks Radio, Institut für Rundfunk-technik, Radiotelevisione Italiana, Rundfunk Berlin-Brandenburg, Red Bee Media Ltd. , Televisió de Catalunya, Universitat Autònoma de Barcelona

- Access to digital and audio-visual systems across Europe standardized
- Digital television for a barrier-free access television for the hearing impaired, deaf, blind and people with intellectual disabilities (captioning)
- Field trials (in the home environment) in Denmark, Germany, Italy and Spain to test new methods so that a barrier-free access is implemented in daily operation throughout Europe
- The connection of a text-to-speech format is standardized in the project developed and tried in Europe, while special emphasis is placed on ease of use.
- Equipment manufacturers to work together to win

Procedure

- In the field test from February to December 2009 assessed hearing impaired and deaf users the design possibilities of DVB-subtitles a week
- The tests should provide evidence of user acceptance and technical feasibility.
- The results will be summarized by 2010 with the aim to develop a European standard.

Findings for ALIAS

- Screen resolution changed
- Font color choice (light density measurements of contrast)
- Storage of personal profile
- Area on the mouse/cursor shows will grow automatically
- Where am I? – Button in the menu (display on the menu level)
- Linguistic feedback of the selected function
- Stringent menu structure, e.g. key assignment in each submenu has the same meaning

4.4 Results of the Secondary Analysis

In the following key results of the extended secondary list are discussed. These results support the use of ALIAS in the project and assist the preparation of a list of necessary functions of the robot. The findings are based on the first secondary analysis published on the 20th November 2010. Gender and diversity will be treated as a cross cutting issue across the whole document.

4.4.1 The Target Group of Elderly

Because of the demographic change, the growing group of elderly gets in focus. We will show the heterogeneous group of elderly from different angles: the needs of elderly vary individually by attributes like age, gender, health status, cognitive constitution, education, income and personal background. Furthermore they differ in values and interest patterns.

The primary target groups of the AAL technology are the seniors and their relatives, but also their informal networks (friends, relatives, neighbors, club colleagues, etc.). Other important user groups are formed by the auxiliary and nursing staff from outpatient and inpatient services and the actors of already existing and newly created services. In extended viewing actors like housing associations, health insurance, hospital facilities in the areas of hospital, rehabilitation and care or insurance are interesting. The needs of the professional staff which has to care the elderly are important too. To give you a few examples: administrative staff of residential nursing homes, doctors, architects/interior as well as the contacts from homebuilders. If the AAL project would like to have success in future, all these groups should be taken into account at an early stage of the project.

The target groups of elderly can be observed and descript in senior citizens centers, because at these places emerging needs are identified and new offers are developed. The senior citizens centers in Munich summarize the offers of the target group as follows: There are user cross deals and offers for specific users – so called „Komm-Angebote". The latter are for elderly with a need for social contact, for people who deal early with aging or who are in a phase of reorientation. Other motives to visit the senior citizens centers are to get involved as a volunteer or to contribute skills. Furthermore the staff of the centers advises elderly, who have special personal problems.

Moreover there are so-called "come- and go-offers" relating the care and advice. These offers are for elderly, who have personal, social, health, financial or legal problems. As well there are offers for people, who suffer from dementia, parkinson's, depression, addiction, mania or health, mobility and sensory limitations and so on.[4]

4 Landeshauptstadt München (Hrsg.): Ihre Wegbegleiter im Alter, Konzeption der Alten- und Service-Zentren in München, Fortschreibung 2006, Sozialreferat, Amt für Soziale Sicherung.

An increasingly large number of elderly are much more confident today. They enjoy aging and manage self-determined their life. Organizations such as the “Gray Panthers” or “The Greys” are representing the rights of the elderly. Active, involved elderly represent the primary group of users for ALIAS. The secondary users are physically and mentally more limited people.

Two examples:

> Maria, 75, has some problems with her back and she finds it difficult to get up in the morning, nevertheless she supports the “grandma-rental service” in her town once a week. Maria was always fit; even if she feels the age, she tries to stay active. She lived alone the last five years and she needs people around her. The self-will and mental fitness of her, makes she to a primary user of ALIAS.
>
> Jacob, 79, needs help from the ambulatory care service three times daily, because he suffers from diabetes mellitus. The nurse gives him his medicine and prepares his meals. Nevertheless Jacob can still move pretty well, but has sometimes dizziness due to his diabetes. That is why he feels very unsafe leaving the house. When he is going to the shop, he is supported by the nursing service. Jacob became very dependent in the last years and need guidance and good encouragement to try new things. He is the prototype of a secondary user of ALIAS.

Secondary users suffer more often from geriatrics then primary users. The most common complaints are listed below:

Table 18: List of common complaints

– Many cardiovascular disease (without heart attack) – Diseases of the brain vessels – Bronchitis – Diabetes mellitus (type II) – Osteoporosis – Some skin diseases and the genitalia – Diseases of the respiratory system – Dementia – Adult onset diabetes – Age gastritis – Atherosclerotic vascular lesions (cerebral, coronary, nephrosclerosis, intermittent claudication) – Degenerative changes of the musculoskeletal system (including rheumatic diseases) – Emphysema – Parkinson's disease

It is now clear that aging processes are changing. People are not only getting older, they are getting increasingly healthier older. The aging process in humans begins later and later. The number of years that people spend in health is growing. The life expectancy of men and women increases mainly because it always starts later in life.

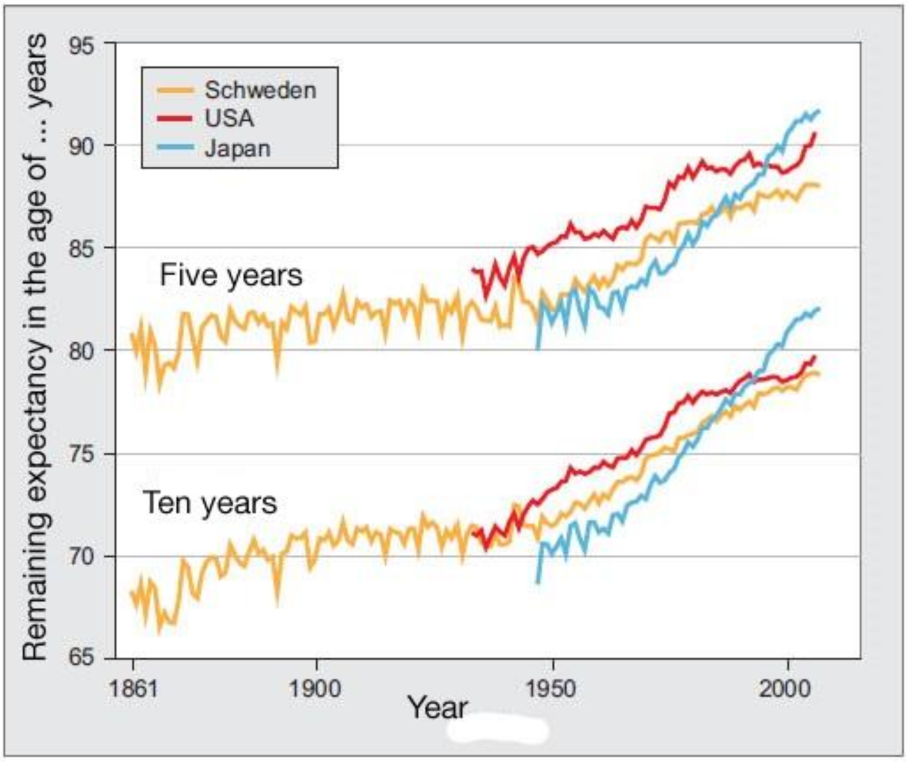

Figure 9: The aging process begins later and later: The average age at which women have a remaining life expectancy of five years or ten years, have increased in recent decades in Sweden (1861-2008), the United States (1933 -2006) and Japan (1947-2008) at the same speed (Vaupel/Lundström: 1994)

The group of generation 65+ will rise till 2030 by about 40 %. It is predicted that elderly are taking a share of 29% that are approximately 22.1 million people. In 2030 would be every third inhabitant of Germany is of the 60+ generation (Vaupel/Lundström: 1994).

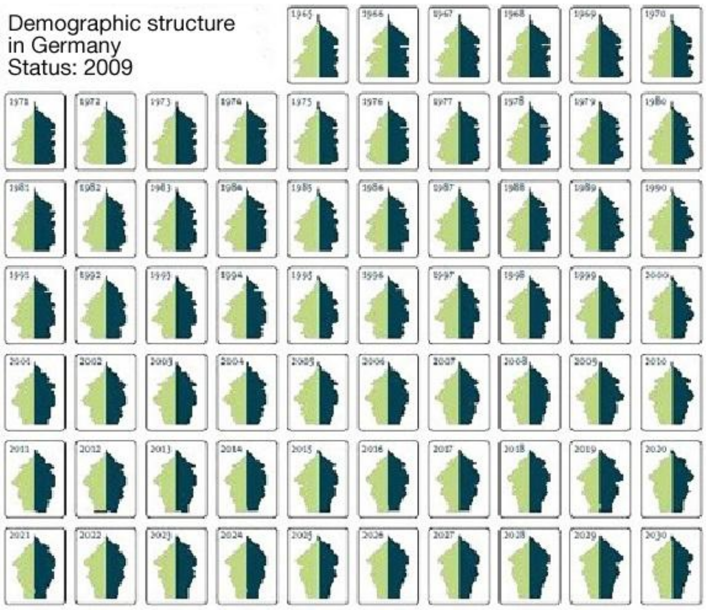

Figure 10:1965-2030: Demographic Nation (Berlin-Institut für Bevölkerung und Entwicklung)

The illustration shows how the population is decreasing steadily. In response to demographic changes, the federal government responded in 2009 with age-appropriate support measures for reconstruction of housing and support that will keep people stay longer living in their homes.

Similar data all over Europe are supposed and will be collected during the project.

4.4.2 Technical Limitations and Different User Groups

Efforts to develop a robot which is suitable for elderly are still at initial stage. That is the reason why the project has to concentrate on special user groups. Our technical development will not be useable at once for all people with all handicaps. This is why we decided to divide the potential users into smaller groups with special interests and needs. People with exclusively physical handicaps are potential primary users, whereas people with also handicaps in mental activity are potential secondary users.

Table 19: Characterization of different user groups

	Knee osteoarthritis	Diabetes mellitus	Dementia	Heart failure	Parkinson	Chronic respiratory diseases	Back pain
Primary	X						X
Secondary		X	X	X	X	X	

4.4.3 Living Alone and Aging

In the year 2009 73 % of living alone women over 60 years were widowed. Around one in seven senior citizen living alone was divorced (15%) and one in ten single

(10%). 2 % of the elderly were married but live apart from the partner. These are results of the census, the largest annual household survey in Europe announced by the Federal Statistical Office (2011) on the international day of older persons on 1 October 2010. Elderly remain alone in their household often after the loss of a partner. As the average life expectancy of men is shorter, more women are affected. Of all women over 60 who lived 2009 in a private home, 40 % lived alone in a one-person household. In the age group 60 to 64 years, the proportion of women living alone was relatively low (23%). In the age group of 70 to 74 years was the sole survivor rate of women, 36%. From age of 85 years almost three quarters (74%) of women lived alone.

Of the single men aged 60 years in 2009 was less than half (45%) widowers, each quarter they were divorced (24%) or single (23%). 8% of elderly were married but live apart from their partner.
Of all men over 60 who lived 2009 in a private home, 18% lived alone in a one-person household. With advancing age the living alone rate is of less than women. From 85 years 35% of men lived alone. Thus, the proportion was less than half as high as for women (Federal Statistical Office 2010).

Solutions in the field of Ambient Assisted Living (AAL) allowing the aging process by declining to physical and mental health lose-health of independence, in their usual ambient to remain tender and yet as far as possible a self-determined life to live in dignity. In the English-speaking world this has developed the concept of "Aging in Place".

4.4.4 Aspects of Networking

For the older population, it is important to maintain social contacts and to encourage and mobilize elderly both – physically and mentally. To cite an example: on the emergency phone the phone numbers of family members or other familiar people and friends are saved. Pressing a number or is even turned on the language mode, the contact to the desired person is established directly.

The range of activities should be made available in some form of structured and compact form of the target group. This can be done, for example through the local supply catalog of the private and public groups, clubs, universities and initiatives.
Senior citizens have the option to inform themselves about special offers on portals like "Active in Age".

4.4.5 Independent Living – Case Studies of Assistance Systems in Homes and "Smart Homes"

Today it is possible for people to live in apartments equipped with assistance systems yet. The support to elderly and frail people can be made with easy-to-use home technology in everyday life. Features are for example the central control of home functions such as heating and blinds or the electric stove that turns off by itself when it is no longer needed. The needs of the older generation are not being implemented properly. Often, conversion and renovation projects necessary to address the desire to live in security, with protection, comfort and accessibility in their own homes, as in Germany, the majority of dwellings are not adjusted for elderly. The implementation may involve significant cost and high cost. But a deportation in nursing homes is to be avoided and the social integration and mobility of elderly will be encouraged. Alternatives must be created in time. Arising from the demographic changes resulting a demand for self-determining life and living forms – the "own home" – with and without assistance or nursing services, make high demands on optimal housing design. Support services offered, as well as intelligent building services opportunities due to the sharp rise in long-term care increases with age and the resulting increasing sales. It creates the demand for individually designed residential and care services. The living room must be made as needed.
The population is shrinking, but not the number of households. First, reducing the structure and development of private households and on the other hand, the trend towards smaller household sizes; favors the smaller budgets by families of only one or two people. The demand for smaller apartments will rise. The increased internal migration, in response to the increased residence and workplace flexibility, the need to raise the work force today, is one reason for the increased demand for smaller flats are (Winfwiki 2011). The number of family members decreases and thus the

care within the family will be in the future not to implement, as is traditional. For maintenance of elderly family members are younger then no longer available.

With integration of with technology into all-day-life and ambience, independent living can be maintained. In the Albert-Schweitzer-Straße in Kaiserslautern (Germany), the construction company Bau AG built homes, which are special in different manners: they are nearly barrier-free and they are designed for close social interaction. Technical heart of the apartments is "PAUL", the "personal assistant for the supporting life". The residents control the flat with this handy- and internet-enabled tablet PC: they can switch the light from the sofa, check that all windows are closed or see who rings at the door. PAUL is easy to use – and it is flexible. PAUL is a research project from the Technische Universität Kaiserslautern about intelligent environments in Assisted-Living Facilities for elderly, in cooperation with the VDE[5], in which a small computer called PAUL, data save stores, processes and home automation control elements and circuits triggers.

When the resident wants to look at a digital picture gallery, PAUL helps. The personal assistant was supplemented by another function in 2009: In every apartment of integration to 30 sensors, which undertake activities, if a light switch is activated, water is consumed or if someone moves through the apartment. The housing satisfaction is high; almost all residents have included PAUL in their daily lives. Popular functions are the control options of home automation: „PAUL stimulated communication and encouraged community processes“ (Winfwiki 2011).

The result of the project is: The technology does not replace the contact with neighbors; on the contrary, it will benefit the user. Residents can exchange information regularly in terms of technical issues. And if something gets stuck, one of the neighbors is addressed.

Another case study comes from Wittlich, also in the region of Rhineland-Palatinate. In a retirement village with the name "Fürstenhof" supervised by FACO Estate Ltd. again, all 41 apartments are equipped with the Smart Living Manager, a service, information and communication module. The functions are available by a simple switch of the TV station. The residents obtain information and services on the screen, the user communicate with the concierge of the estate by remote control.

[5] Association of Electrical Engineers

As a third use case we present "Dementia Flat share", three residential communities with residents suffering from dementia. The project is supervised by the home care service ALPHA, a subsidiary of social work, St. George. Important features are the shutdown of the stove. Thanks to the smart home technology it switches off even when a smoke detector sends appropriate signals.
Special attention must be put on the natural interaction between human, technology and services. The use of age-appropriate assistance system should open up new opportunities for elderly, their mobility and participation in public life. At the same time the technology must not restrict personal freedom. This affects the right to autonomous decisions and the privacy (data protection) as well as the attention that interpersonal interactions are maintained. Human care and technical support services should go hand in hand. The examples show that AAL is multifarious depending on the context. Sometimes, the assistive technology is integrated in a neighborly atmosphere, sometimes in a service approach, sometimes in a nursing care concept. The use of robots in an AAL-environment is still relatively unexplored, but there are some robotic platforms, the intention in the direction of AAL's. The Care-O-bot is a manipulative mobile robot assistant that can be used in a home environment in daily life.

ALIAS joins in this landscape as a central communication office in the user's budget. The robot ALIAS is not designed to replace any human partner; it does rather aim to promote contacts with other people as possible to get a lot of independence.

What does support the independent living of elderly? The working group of the VDI[6] "user acceptance and innovation transfer" discusses the support in financial management (shopping, cleaning, food preparation etc.), the reduction or technical compensation barriers in housing and living environment, the parameters of an AAL-friendly housing facilities, etc. The adequate protection of privacy and intimacy, the maintenance of autonomy and self-determination and the rejection of technologies must be thought along and be discussed with all these points.
Furthermore, there is a discussion about the issue of security, social inclusion and the promotion of the health situation. The requirements of the different user types to

[6] VDI – Verein Deutscher Ingenieure e. V. (Association of German Engineers)

the operation of the assistance systems are also subject of the research: It is not just about the general issue of usability: The particular challenge is to discuss topics like: the design of the interfaces for impaired users (accessibility, interfaces for restrictions on the senses and cognition, voice and gesture control, self-learning systems etc.), the design of technologies (attractive design, no stigma) and the application of the guidelines of universal design within the meaning of the users.

Smart homes are the trend towards integration of information and communication technologies in the living area by networking sensors, control units and other communication interfaces, which are centrally controlled and coordinated. Figure 11 illustrates the internal and external networking of a Smart Home:

Figure 11:Networking of a smart home (BIS)

Smart homes can make many things easier and can reinforce the desire of this lifestyle.

Here are some providers in the area of Ambient Assisted Living (AAL). Its focus is on home automation and the integration of technical solutions for elderly:

- AAL project HDSonline (Implantable Hemodynamic Sensor): A sensor for measuring the cardiac pumping performance, its data can be transmitted via a GSM mobile transmitter to the Heart Rhythm Center and will in future serve as an implant for heart failure patients. Project partners: BIOTRONIK GmbH & Co, Microsystems Eng.
- AAL-IN-MONIT project: INohr-implementiertes MONIToringsystem implemented for the preventive monitoring of the cardiovascular function of patients at risk. An implantable sensor in the ear, the physiological measure-

ment data wirelessly to a portable device transmits and when limits are exceeded alarm. Partners: MCC GmbH Karlsruhe, CiS Institute for Micro Sensors gGmbH Erfurt, the Audia Akustik GmbH, Sömmerda and RWTH Aachen – term to March 2009.

- AAL project TELEMAX: Telemetry diagnostic network for mobile remote monitoring of risk patients. A cardinal sensor detects events, results and sending data via Bluetooth to a wireless access point. Project duration until April 2006 – Partner: Corscience GmbH & Co. KG and others.
- Björn Steiger Foundation: Free tracking platform for 112 emergency call centers "LifeService 112": Free registration of mobile phone numbers, location of a phone with GPS functionality at triggering an emergency call, LifeSensor emergency record: the storage of emergency information for transmission to the on-site incident or emergency services to physicians by holders of the emergency record.
- Bremen: Ambient Assisted Living Lab: Testing of new techniques related to the AAL-road capability.
- Smarter Living NRW: Pilot project for the integration of micro systems, home networking and services in up to 50 flats.
- SOPHIA: Senior service facility with 24-hour service with the use of security and communication technology security strap for emergencies, which can independently trigger an emergency call service offerings on service platform in the household and care sector, Artisan mediation, family contact . All controls on a television set (about 50 € a month). Requirements: broadband and fixed line (+ extra charge) and emergency mobile phone (24 € per month).
- TU-Braunschweig GmbH & DOMOLOGIC: Project: "Home Automation" free-per-programmable control units (JControl/Colibree) and communication modules that can communicate over power lines.
- SOPRANO: The Fraunhofer Institute has developed the project SOPRANO (Soprano 2011) to appropriate concepts and methods. The aim of the EU project SOPRANO is therefore to identify the "want" technology for elderly and how "to make operable." To achieve this goal, the ILO and the Fraunhofer Institute for cooperating and Technology Management, University of Stuttgart IAT have developed concepts for the development of interactive devices, which take into account in every phase of the needs of end/inside. Fraunhofer IAO has developed for SOPRANO a user interface concept for the TV and an additional touch screen which is indeed unusual for the elderly, but intuitive and easy to use. The concepts are compatible and ensure ease of learning. The experts from IAO take into account age-related factors as well as visual impairments or mild cognitive problems (Fraunhofer 2011). The technical implementation of the concepts is soon in three test environments, so-called Living Labs, made in the Netherlands, Spain and the UK. In addition, the technology in up to 300 households will be installed for older persons and evaluated. This field test will provide information on the acceptance and further research needs.

Furthermore, there are residential formats, set the value not only to the mechanization, but also networking with the social environment. A successful example is the senior service of some housing companies in Berlin (e.g. village in Heller: "City and Country" social person care – aid in everyday life). Among them are affordable care options in a large settlement around the clock to understand. The apartments are connected with child care, emergency services and neighborhood assistance. The housing association GSW in Berlin has created several offers for senior citizen housing. They offer to rebuild apartments for disabled or elderly and help with financing. For the elderly it is purchasing services including delivery, the delivery of hot meals from a menu service, maintenance and cleaning of the apartment, and networking to the medical emergency service through the installation of a 24-hour emergency call system. There is a growing demand to use this service in their own home in order not to move away from familiar surroundings or having to give up the apartment. Here the question arises as a direct emergency service, after an emergency connection to the existing members to the doctor or the hospital.

4.4.6 Mobility Behavior of Elderly

Higher car availability and changing life styles of so-called "young seniors" causes higher rates of mobility compared to the same age groups in earlier times. While elderly currently cover a high proportion of their way by feet and by public transport than younger adults (e.g. Affairs, 2010, Cao et al, 2007.), more elderly, especially women, will have a driving license and have a car in future. (ILS - Institute for Regional and Urban Development, edition 1/10)

4.4.7 User Interface Design – A Question of Age?

The results of a study of User Interface Design GmbH (UID) and the high-school of the media (Media University) are that older users suffer of more problems in the operation of interactive products. These difficulties are not as severe as previously assumed. Cause of operating problems, different experiences with interactive products and age-related changes in behavior. In addition, the study shows how to design products for as many age groups, easy to use (UID 2011).[7]

Conclusion of the study was e.g. the designers select the inside tag so that they correspond to the experiences of users of the use of interactive products. This is reduced to re-learn knowledge and facilitates the use of technology. In addition, only the information presented, which are required to fulfill the task at hand. The reason: A large number of graphical elements on the screen feel older users of a burden.

In two studies, experts have identified as older and younger User deal with a DVD-HDD recorder, a digital camera and the "iPod Touch"and the multitouch Surface table. This solved the subjects with the test equipment tasks such as a photo to include in the dark. "Usability engineers observed and interviewed the people when editing tasks and evaluated the operating problems. Both the three everyday devices and to the surface had the elderly more problems than younger ones. The differences between old and young are not as serious as previously thought. Age is therefore in the operation of interactive products only a minor role, prior knowledge on the other hand all the more. An example from the study: elderly have a different technical knowledge. The earlier-Ren Test participants problems, an address in the "iPod Touch" had entered. They understood the term "contacts" is not used in the "iPod Touch" for the address book. The younger test participants knew the term, however from the Internet and e-mails.

For senior citizens actually benefit from these opportunities, it must correspond to the interaction with the devices and the capabilities and needs of the user group.
There should be easy comprehension for all users, including support persons or caregivers.
The adaptability of the user interface should be possible by the user who is supported by the robot.

Easy alarm in emergency situations including the utility in connection with telecare installations should be considered in the user interface. Foreign languages as well as anglicism should be avoided.
It is necessary to integrate consultation dialogues (such as "Are you sure you know that …") prior to the execution of actions and to consider simple functions to cancel

to reduce barriers of fear in the operation of new systems . Convenience and simplicity are priorities.

The technology will help in planning and carrying out daily tasks and make the growing physical limitations of age bearable. Therefore ALIAS needs a self-explanatory system, an intuitive user interface and uses the approach of the system over the surface without extensive prior knowledge to be essential prerequisites. With physical control including a switch to voice control or change the font size, and a movement of the display is necessary. This also takes into account physical impairments. The operation should be limited to basic functions, which will be required at ALIAS.

4.4.8 Shopping Escort Services

The St John's Ambulance offers area shopping escort services in Düsseldorf. Here the seniors are picked up by car at home. Another thoughtful service is the "rolling supermarket", an association "mobile point of sale ", which stops right outside the front door. The shopping is done directly on a user interface with a specific product overview. A shopping list is created and the user gets their purchases without leaving the house.

4.4.9 Silver Gamer – Silver Gamer-Realization of Attractive and Exciting Game-Based Multi-Media Applications

The project silver game[8] encourages the approach of virtual contact with the real social interaction and leads to social integration through the sharing of the same "virtual" hobbies and passions such as singing, driving, dancing. Web-based information services can help socially isolated and lonely people to be active in their daily lives. On the one hand, users are required to have fun with the gaming mode of various multimedia applications such as

A) "The multimedia simulator for cognitive training",
B) "A Virtual Silver Song Club",
C) "Dance and Fitness Training ".

On the other hand, the user can be obtained with additional web-based information and contact discount travel or dating services that are integrated into the multimedia environment.

[8] http://preview5a.exozet.com/silvergame/

Figure 12:Silver Gamer (Silver Gamer 2011)

4.4.10 Summary of Requirements from the Perspective of Elderly

First, it is quite important for elderly to decide on their own and be able to live socially appropriate. This must not be forgotten in the development of technically supporting AAL systems. Senior citizens require a need-based implementation to integrate technology into their daily life.

In the 65 + group the use of the internet is increasing. Even the group of 70 + generation does so, according to a study of the initiative D21.

Technology should be used as a supportive measure for the aging population. "The most important objective in the integration of future-oriented technology is a reasonable match between need and reasonable, feasible, and value-border use. The cost-benefit ratio must be balanced for all parties involved. That is a less costly overall implementation, with minimal maintenance, is reasonable in the current environment. The technology must be extensible and adaptable to the particular stage of life. The majority of elderly just want to stay the age in their own home, in familiar surroundings. Therefore, the case study presented here considers mainly the approach of the retrofitting system components in buildings and private homes.[9]

[9] (http://winfwiki.wi-fom.de/index.php/Smart_Home-Anwendungen_im_Seniorenbereich)

4.4.11 Summary of ALIAS Functions

ALIAS reminds:

- taking your pills,
- birthdays,
- important events,
- seeing the doctor,
- making appointments.

ALIAS acts:

- dialing phone numbers,
- working as an remote control,
- making emergency calls,
- leading to plays and sports like Wii,
- lighting the way at night.

ALIAS provides special functions:

- supporting providers of nursing services

5 Discussion and Conclusions

This document lists an overview of the activities related to user inclusion. In this stage a final report on a list of selected functions depending on completion of concepts by other partners is included.

Because of demographic change, the growing group of senior citizens is getting stronger attention. Elderly people and their relatives are seen as users of AAL technology, but also their informal networks (friends, relatives, neighbours, club members, etc.). These were observed in preparing a list of requirements. Usability and appropriateness of solutions are very important for commercial acceptance in future.

Women are an important target group for the development of ALIAS. They live much longer than men and live more often as a single. That is why we take into account their needs particularly.

AAL is to adapt this through the use of intelligent technology, the living conditions of aging people in their homes to their changing needs, such as their safety or in emergency situations to raise in her apartment, if their vital signs monitor, memory functions support or work against even the threat of social isolation. AAL although not to the consideration of technology alone may be limited and may, therefore, think with the social and organizational involvement of medical providers, friends and relatives must, however, is to achieve the objectives of the AAL technology is essential.

Typically, different technological fields contribute to the solutions. The integration of smart homes technologies, ambient intelligence approaches, sensors, actuators, human-machine interfaces, embedded systems solutions requires the cooperation of a variety of partners from different technical and non-technical areas such as software development, device development, telecare/telemedicine, and medical care providers in particular, home health care services.

Demographic demands interaction between people and technology. To make technology more suitable for seniors, the results of users' needs have to be considered early.

5.1 Discussion of the List of Selected Functions

To get a list of applicable and feasible functions a document was provided, containing all the required features that were mentioned in the workshops by potential users/experts and in the secondary analysis. The technical partners were asked to express their opinions on the list and to assess the feasibility of the various functions. The detailed list is below. The appended list of functions shows the realizable functions according to the partners and is retrieved from AAL-Alias Wiki (http://wiki.aal-alias.eu/alias-wiki/index.php/List_of_functions). The partners were able to complement their responsibility, the status and tasks. The wiki-list arose from a discussion on the Google spreadsheat (which resulted from the survey among seniors and families, as well as analysis of the secondary) of the actually feasible functions with all partners on 27th of January 2011 in Berlin. The wiki will be continuously updated.

This section is focused on the actual realizable functions and the only potentially feasible functions. Findings from the workshop and secondary analysis according to these functions are mentioned as well.

The first part provides a list of feasible functions, which means that these functions are immediately to realize. Each category is itemized and indicates what functions are possible to realize:

5.1.1 Category: Support

Reading support functions like a read out function for digital books or newspapers, magnification of pictures and texts (not only for digital content, also for letters, photos, magazines) as well as the translation of texts and user manuals were a wish of elderly in the workshops. As shown in secondary analysis especially reading the newspaper is one important task of the elderly. The following two use cases show also the advantage of a read out function:

> Maria (75) has problems with her eyes and cannot read as long as she wants. Her eyes hurt after a while. This morning her grandson sent her a digital book, named "Harry Potter". ALIAS now tells her the story. Peters (71) son sent him an interesting article about the political situation in Egypt. Peter cannot read the lowercase letters and uses the support function to magnify these.

A **function for writing letters** (e.g. per speech or stylus) is a necessary function, too. A function for writing and adding shopping lists (e.g. per speech or stylus) has to be added and is already part in some smart homes (see secondary analysis). How important a speech control of the robot could be, shows the following use case.

> Hans (78) wants to write his old friend Jim in UK. Jim is able to speak German, but Hans wants to do his best in telling Jim everything what happened in the last year. Hans' hands are shaking since he is seventy years old and so he is happy to have ALIAS helping him out.

Alias needs **ground lighting** and a gentle night light, which could be very useful at night. This could be very important in the following use case. Peter (71) stands up at night to drink some milk since he was a little boy. ALIAS recognizes him and turn on the light, so that Peter will see ALIAS standing in the edge of the room.

5.1.2 Category: Health

The health of elderly people is very heterogeneous. The number of years that people spend healthy is growing. The motivation to live healthy is really important. Support with rehabilitation and sport exercises (e.g. gymnastic or cardiovascular exercises after hip or knee replacements, apoplexy, heart attack) could be realized.

These functions for motivation could be realized by the recommendation of sports activities and contacts to training partners.

Health monitoring is another important point: Measuring of health status (e.g. for diabetics or blood pressure) and storage of health history and status (important: data security and privacy); storage of important personal and health information (e.g. diseases, passwords, repository of spare keys) is one important issue. Another one is how to get information on drugs and on prevention and identification of diseases. This is realized in a function including information on health topics.

You can find more information about the health monitoring functions in chapter 3.2.1.

5.1.3 Category: Events, Leisure and Hobbies

Next to **TV functions a music player** is a very important function.

Games that support cognitively and physically are very suitable, but also the particular health condition and preferences must be taken into account. According to the study of a German credit institute "Deutsche Bank", especially in senior games a progress could be found.

According to the partners the following game functions could be realized:

- mentally challenging online-games (e.g. chess, cards)
- sports games a la Wii, that help to train balance and coordination

Information on cultural and leisure events would be nice to have. Concerts, theaters, plays, museums, social connection as well as meetings of sports groups, worship services, neighborhood meetings are realized as events. So the following use case gives an idea:

> There is a new exhibition about the Maya culture in town. Hans (78) loves old cultures. ALIAS knows this and sends him dates and selected information about the exciting exhibition. Hans (78) wants to know if there are like-minded people in his age who are interesting in the Maya culture too. ALIAS finds in the area a senior club offering a trip the exhibition.

5.1.4 Category: Communication

Elderly people want to stay in contact with their social environment, preferably by using the telephone. ALIAS includes Skype to phone and – if wanted – see the dialog partner via video and an easy-to-use contact list. This could support intergenerational communication e. g. with grandchildren; encouraged by playful elements. ALIAS also includes an e-mail function e.g. which makes it possible to share photos. In one use case calling back a relative was shown in detail.

Detailed information about the communication tool of ALIAS can be found in chapter 3.2.1.

5.1.5 Category: Usability and Design

The ALIAS prototype comes with a display unit, which can be adjusted. So a flexible, adjustable display to be used by people with different body heights (applied on a flexible arm) would be realized. Other points in this context are the adaption to individual requirements depending on the clinical picture and the level of care and the individual adaptability of the degree of assistance (just assisting as much as it is necessary or requested by the senior, to avoid deterioration).

For the graphical user interface there are some important points to focus on according to secondary analysis. Some studies showed that it is necessary to choose terms such that they correspond to the experiences of users in the use of interactive products. An example is the use of the easier to understand word "address book" instead of "contacts" (valid for German only).

Only real necessary information should be shown because a large number of graphical elements on the screen can be seen as stressful. An intuitive operation is necessary as well as highlighting of the most important control elements. So a stepwise addition of new functions based on individual needs and interests is also useful as leading careful to the operation, repeating the steps of operation or giving feedback, whether an order was understood or not.

Technical functions are other points to mention in ALIAS. The importance of ports, connectors, sockets and card readers (bluetooth, USB, reader for electronic health cards, scanner with easy-to-use feeder) as well as data input for users have to be very easy to use and speech controlled.

Simple situational choice between voice control and touch screen control as well as the choice between female and male voices e.g. voices of celebrities would be a nice feature.

5.1.6 Category: User Contact

ALIAS can be a friend, which was one wish identified in the workshops. So the following characteristics of ALIAS should be realized:

- be loyal and gentle
- take a joke (e.g. reading out the joke or the motto of the day)
- welcome the senior and his visitors
- say "good morning", "good night", "you are welcome" and "thank you"
- announce date and day
- be authentic
- make offers e.g. "Would you like to go for a walk?"
- ask for rituals e.g. "Should the light stay on today?"
- give not only yes/no-answers

An independent perception and recognition of the user are very useful by making and maintaining eye contact. To have the user in contact with the robot, ALIAS should keep eye contact, when it speaks to the user. Despite this, if the user speaks to another person via the display, both should maintain eye contact, too. So the kind of eye contact depends on the counterpart.

After this breakdown, user inclusion (WP1) expects the appended list of functions from AAL-Alias Wiki. This list is retrieved from "http://wiki.aal-alias.eu/alias-wiki/index.php/List_of_functions". The table with responsible can be found below.

5.2 The List of Functions

Table 20: The list of functions including responsibilities of technical partners

Category	Function	Details	Responsi-bility	Status
A)Support				
	Reading support functions	read out function for digital books, read newspaper	TUM-MMK (waf)	Important function as promised in the original proposal but medium priority. General engineering approach: use of HD still cam (200k€) which may be externally triggered over the dialog manager. Existing OCR tools will process the input image in the backgrond and show the image respectively reads the recognized text. Mailing to relatives is also possible. Implementation in 1st iteration. Involved tasks: 2.3, 2.4, 2.5, 3.2, 3.3, 3.8.
		magnification of pictures and texts (not only for digital content, also for letters, photos, magazines)	IUT	Checked the native windows 7 magnifier. Good usable with mouse, almost impossible to use with touchscreen. Checked also ZoomIt 4.1, wich is ONLY usable with mouse. The application "Virtual Magnifying glass" is okay to use with touch. Zoom is only editable with a scroll wheel (on the mouse), so not availible here. With the first click the magnifying window disappeares and has to be restarted to use again. => no really good application for touchscreens!
	Writing support functions	function for writing letters (e.g. per speech or stylus); function for writing and adding shopping lists (e.g. per speech or stylus)	Fraunhofer	
	Ground lighting in the night, gentle night light		MetraLabs	Investigate
B) Health				
	Motivation to live healthy	Recommendation of sports activities and	G.Tec.	

Category	Function	Details	Responsi-bility	Status
		contacts to training partners; Support with rehabilitation and sport exercises (e.g. gymnastic or cardi-ovascular exercises after hip or knee re-placements, apop-lexy, heart attack)		
	Health monitoring	Measuring of health status (e.g. for diabet-ics or blood pressure) and Storage of health history and status (Important: data secu-rity and privacy); Sto-rage of important per-sonal and health in-formation (e.g. dis-eases, passwords, repository of spare keys)	G.Tec.	
	Information on health topics	Information on drugs and on prevention and identification of dis-eases	Cognesys	
C) Events, Lei-sure and hob-bies				
	Information on cultural and lei-	Concerts, Theaters, Plays, Museums, So-	EURECOM	T4.1-T4.5

Category	Function	Details	Responsi-bility	Status
	sure events	cial Connection (similar interests)		
	other Events	meetings of sports groups, worship services, neighborhood meetings (note: only few use of social network! (see D1.1)	EURECOM	T4.1-T4.5
	Receiving and performing tips for entertainment from relatives	Recommendations	EURECOM	T4.1-T4.5
	Learning / teaching functions		Cognesys	
	TV-function	Sports entertainment; Infotainment; Entertainment broadcasts	MetraLabs	Investigate
	Music (player)	Listen, buy, make (Sing together with robot, or robot could play accompanying instruments)	Cognesys	
	Gaming	Mentally challenging online-games (e.g. chess, cards); Brain teasers; Sports games a la Wii, that help to train balance and coordination; Games which can be played	TUM-MMK Cognesys	This is task 3.4

Category	Function	Details	Responsi-bility	Status
		by young and old people together; Games which can be played by young and old people together: Replacing missing game-partners		
D) Communica-tion				
	Telefone	Skype	EURECOM	see Task T3.5
	E-mail	e.g. share photos	EURECOM	
	Easy-to-use contact list	Contact via Photo	Cognesys	
	Support of in-tergenerational communication	e.g. with grandchil-dren; encouraged by playful elements	Cognesys	
E) Usability and Design				
	Flexible, adjust-able display to be used be people with dif-ferent body heights (applied on a flexible arm)		MetraLabs	investigate (T7.2)
	Importance of ports, connec-tors, sockets and card read-ers (bluetooth,		MetraLabs	investigate (T7.2)

Category	Function	Details	Responsi-bility	Status
	USB, reader for electronic health card, scanner with easy-to-use feeder)			
	Data input for users has to be very easy to use and speech based		Fraunhofer TUM-MMK?	not yet clear who integrates ASR, belongs to WP2/3. Has to be clarified
	Simple situa-tional choice between voice control and touchscreen control		Cognesys	
	Simple and intuitve operati-on	Highlighting of the most important con-trol elements	Cognesys	T2.1.
	Adaption to in-dividual re-quirements de-pending on the clinical picture and the level of care	Individual adaptability of the degree of assis-tence (just aiding as much as it is neces-sary or requested by the senior)	G.Tec Cognesys	
	Stepwise addi-ton of new func-tions based on individual needs and interests	Leading careful to the operation; Repeating the steps of opera-tion; Giving feedback, whether order was	Cognesys	

Category	Function	Details	Responsi-bility	Status
		understood or not		
	Remote confi-guration of func-tions and calen-dar events		TUM-MMK	Calendar: is done by using google calender
	Individual de-termination of access privileg-es		TUM-MMK	
	Choice between female and male voices e.g. voic-es of celebrities		Fraunhofer	
	GUI: Choose terms such that they correspond to the expe-riences of users in the use of interactive products.	Example: Use "Ad-dress Book" instead of "Contacts"	Fraunhofer	
F) User Contact				
	Independent perception and recognition of the user	Making and maintain-ing eye contact (ALIAS should main-tain eye contact, when it speaks to the user; if the user speaks to annother person via the display, both should maintain	TUM MMK	planned in combination with face recognition: ALIAS detects and looks at faces

Category	Function	Details	Responsi-bility	Status
		eye contact, too --> Kind of eye contact depends on the coun-terpart!)		
	Being a friend - ALIAS should:	a) take a joke (e.g. reading out the joke or the motto of the day); b) announce date and day; c) say "good morning", "good night", "please" and "thank you"; d) make offers e.g. "Would you like to go for a walk?"; e) wel-come the senior and his visitors; f) not only give yes / no - an-swers	IUT	a) assuming we have sufficient speech synthesis there are some options: one there is an english web-service availible (http://puna.net.nz/jokes/jokes.asmx) to get access to a data base, second there is a RSS joke-feed availible, which randomly selects a joke every hour (http://www.witze-datenbank.de/witzstunde.xml). These jokes can be read out b) should be no problem with speech synthesis since these information are easily availible within the sys-tem c) depends on the flexibility of the dialog manager (or can be included into the design process ???) d) more complicated issue, since these are random events that have to be generated with back-ground knowledge of the agenda of the day, the weather, health sta-tus and so on: who will implement the interface to the dialog manag-er and will the dialog manager handle such information? e) the main problem is to detect when a person is comming home. This needs information how long a person has left the home or if the person stands up in the morning. The rest of the problem is covered by ap-proaching the person and greet the person by speech synthesis. But quite a complex task ... f) done, when all points above are fullfilled

6 Appendix

6.1 List of Tables

6.2 List of Figures

7 Literature

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