WP8- Piloting & Validation

D8.1 Piloting Definitions

Deliverable Lead: CHA

Contributing Partners: ASC, AITEX, TUDA, NFE, TALK, ESE, TIE, IESE

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This document will provide a framework of pilot specific use case scenarios. It will give a storyline about the specific functions ALFRED has to fulfill and describe the interactions in the pilots of T8.2, T8.3 and T8.4.
The deliverable will rely on results from the user stories and the market watch of WP2.

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Project Partners

Ascora GmbH, Germany	Atos Spain sau, Spain
Worldline, Spain	Charité - Universitätsmedizin Berlin - Department of Geriatrics, Germany
Asociacion de Investigacion de la Industria Textil, Spain	Technische Universität Darmstadt, Germany
National Foundation for the Elderly, The Netherlands	Talkamatic AB, Sweden
E-Seniors, France	TIE Nederland N.V., The Netherlands
IESE Business School, Spain	

Executive Summary

The main goal of this deliverable is to describe, plan and define how the use cases and user stories from D2.3 will be tested in the different pilots - T8.2 Piloting and Validation Group I: Individual Usability; T8.3 Piloting and Validation Group II: Hospital and T8.4 Piloting and Validation Group III: Association. The document will be delivered in two different versions. The currently available first version D8.1 will describe the iterative evaluations and the evaluation process starting at M12 and give a first overview of the pilot. The second version of this document will be available in M18 and provide the results of the iterative evaluations and detail the pilot evaluations in the different countries.

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1. Introduction

ALFRED – Personal Interactive Assistant for Independent Living and Active Ageing – is a project funded by the Seventh Framework Programme of the European Commission under Grant Agreement No. 611218. It will allow elderly people to live longer at their own homes with the possibility to act independently and to actively participate in society by providing the technological foundation for an ecosystem consisting out of four pillars:

- **User-Driven Interaction Assistant** to allow older people to "talk" to ALFRED and to ask questions or define commands in order to solve day-to-day problems.
- **Personalized Social Inclusion** by suggesting social events to older people, considering his interests and his social environment.
- A more **Effective & Personalized Care** by allowing medical staff or carer to access vital signs of older people monitored by (wearable) sensors.
- **Physical & Cognitive Impairments Prevention** by incorporating serious gaming to improve the physical and cognitive condition by offering games and quests to older people.

1.1 ALFRED Project Overview

One of the major problems today is the increasing isolation of older people, who do not actively participate in society either because of missing social interactions or because of age-related impairments (physical or cognitive). ALFRED will allow overcoming this problem with an interactive virtual butler for older people, which is fully voice controlled.

The ALFRED project is wrapped around the following very clear main objectives:

- Empowering people with age related dependencies to live independently for longer by delivering a virtual butler with seamless support for tasks in and outside the home. The virtual butler ALFRED will have a very high end-user acceptance by using a fully voice controlled and non-technical environment.
- Prevailing age-related physical and cognitive impairments with the help of personalized, serious games.
- Fostering active participation in society for the ageing population by suggesting and managing events and social contacts.
- Improved care process through direct access to vital signs for carers and other medical stuff as well as alerting in case of emergencies. The data is collected by unobtrusive wearable sensors monitoring the vital signs of older people.

To achieve its goals, the project ALFRED conducts original research and applies technologies from the fields of Ubiquitous Computing, Big Data, Serious Gaming, the Semantic Web, Cyber Physical Systems, the Internet of Things, the Internet of Services, and Human-Computer Interaction. For more information, please refer to the project website at http://www.alfred.eu.

1.2 Deliverable Purpose, Scope and Context

This deliverable reflects the planning of the tasks in WP8. The pilot evaluations in WP8 consist of two different types of evaluations. First of all the pilot site partners will organize evaluations of the early prototypes of ALFRED together with the end-user partners. This early prototype testing will prevent expensive development tasks that are not in line with end user expectations and requirements. These evaluations will be organized iteratively according to the outcome of different early prototypes and will focus on usefulness and usability for older persons. The iterative evaluations will be organized in a controlled environment together with researchers and older people.

In the second phase the pilot site partners will plan the actual pilots. During these pilots the end users will test the ALFRED solution during a longer period of time in a normal situation in their home environment. These pilots will provide data on the impact on quality of life of older people and also on business aspects.

This document will first describe the iterative evaluations and then the three pilots that will be organized in Germany, France and the Netherlands. As mentioned the pilot evaluation will be organized under real life conditions for a defined period. The present deliverable will shortly describe the three different pilots. In month 18 a second version of this deliverable will detail the exact planning and methodology of the pilot evaluation.

Each pilot will consist of different steps: (i) The piloting of the current ALFRED prototype and (ii) the validation of the results by collecting feedback and providing it to the consortium.

Each pilot will perform more than just user interviews and trials but also technical infrastructure designed to contribute to the pilot objectives. More precisely, this means that the pilots will create pilot specific apps in close collaboration with the app building tasks of work packages 4-7, namely tasks 4.5, 5.5, 6.5 and 7.4. While WP4-7 will concentrate on the core technical aspects of the app development, the WP8 activities will concentrate on providing the pilot specific data and the logic as well as the app conceptualization and all other elements that go beyond the pure build and deployment process.

Pilots of ALFRED will be performed in different EU member states. The first pilot will be performed in the Netherlands (T8.2), the second one in Germany (T8.3) and the third one in France (T8.4). However, it cannot be expected from older people to speak or understand proper English in all cases. To this end, each prototype will start with a localization as a part of the iterative evaluations. This localization will include the translation of apps and component elements into different languages but it will also include the adaptation of other cultural environments such as units or time zones. Each pilot contains one or more technical partners which will support this adaptation process from a technical level. Section 3 will describe this process in more detail.

The overall objectives of the iterative evaluations/pilots are:

- Confirm the project results within industrial piloting environments
- Define use cases in a more detailed way
- Realize pilots within 3 different countries
- Evaluate use case results and provide continuous feedback to technical partners
- Localize the project results into different languages and cultural environments

1.3 Document Status and Target Audience

This document is listed in the Description of Work (DoW) as “public”, as it provides general information about the goals and scope of ALFRED and can therefore be used by external parties in order to get according insight into the project activities.

While the document primarily aims the project partners, this public deliverable can also be useful for the wider scientific and industrial community. This includes other publicly funded projects, which may be interested in collaboration activities.

1.4 Abbreviations and Glossary

A definition of common terms and roles related to the realization of ALFRED as well as a list of abbreviations is available in the supplementary document “Supplement: Abbreviations and Glossary”, which is provided in addition to this deliverable.

Further information can be found at http://www.alfred.eu.

In order to understand better the ALFRED pilot plans and evaluation, the following definitions should be given:

- **Iterative Evaluation:** evaluation of ALFRED solutions with end users based on rapid prototyping methods to test usability and usefulness of the technical solutions in an early stage of the project and in iterative short cycles during the development and design process.
- **Pilot Evaluation:** implementation of the technical solutions in real life surroundings to study the impact of ALFRED services.
- **Use Case:** a scenario reflecting the use of ALFRED solutions.
- **User Story**: a user requirement summarized in a short sentence. Different user stories together can form a Use Case.
- **Use Case Script**: a sequence that reflects the consecutive interaction of the user with the system to reach a certain objective.
- **Test Task:** a standardized, brief and precise task which is derived from a use case that directs the user to perform a specific task, during an evaluation session in order to test a certain objective using ALFRED.

1.5 Document Structure

This document describes the test plan for conducting the iterative evaluations and pilots of the early prototypes. Chapter 2 provides information on the iterative evaluations and methodology that is employed in the testing procedure that will take place in France, Germany and the Netherlands. Chapter 3 gives a first overview on the pilot evaluations for the individual usability (Pilot 1), the hospital environment (Pilot 2) and the Day-to-day usage (Pilot 3). Chapter 4 deals with ethical issues and regulations involved in the testing of the ALFRED system, such as data protection. Chapter 5 contains background documents that are needed for the testing procedure such as workbooks, questionnaires, non-disclosure and informed consent forms.

2. Iterative Evaluations

Prior to the pilot evaluations (tasks 8.2, 8.3 and 8.4), iterative evaluations with ALFRED end-users will be performed using low-fidelity prototypes. Iterative evaluations enable the ALFRED partners to identify user demands, needs or behaviors of potential users at an early stage of the project so that they can be taken up and feedback them into the implementation process. User testing often can reveal that even thoroughly planned ideas do not meet adequately the real life requirements. Therefore it is crucial that the iterative design approach reaches as deep into the project workflow as possible. Once the iterative cycle works, improvements or changes may be applied to increase or improve functionality of the overall design. This section describes this process.

The iterative evaluations will be of an explorative nature and collect data about various aspects of the ALFRED project. They will focus on obtaining end-users' feedback on usefulness and usability throughout the project. Iterative evaluations will involve older end users in the project in short cycles, running in parallel to the technical development and give rapid feedback based on qualitative research.

The goals of the usability research include establishing and validating user performance measures and identifying potential design concerns to be addressed in order to improve the efficiency, productivity, and end-user satisfaction.

2.1 Evaluation Goals

The objectives of the iterative evaluations are:

- To determine design inconsistencies and usability problems in the user interface and apps. Potential sources of problems may include:
  - Navigation– failure to locate functions, excessive repetition to get to desired function, difficulties with speech interaction, failure to follow recommended interaction flow.
  - Presentation– failure to locate and properly act upon desired information in screens or speech output, selection errors due to labeling ambiguities in speech or graphic.
  - Problems in syntax – failure to use the proper language by the user or ALFRED, using language that can be either too difficult or too technical by ALFRED.
  - Control usage problems – improper entry of data or speech commands
  - Field usage, problems in the communication with ALFRED under real-life conditions
- To test the ALFRED solutions under controlled conditions with representative users. Data will be used to access whether usability goals regarding an effective, efficient and well-received user interface have been achieved.
- To establish baseline user performance and user-satisfaction levels of the user interface for future usability evaluations.
- To measure the user preferences of different functionalities.

The iterative evaluations will run in three countries (France, Germany and the Netherlands). They are coordinated by NFE in the frame of task 8.2. These activities are

planned additionally to the tasks in the DoW, due to the important nature of early prototype testing.

This chapter will first give an overview of the timeline and the research participants who will be involved in the iterative testing. It will also give an overview of the applied methodologies. Finally it will define the first tasks or use case scripts that are based on the user stories from D2.3. The use case scripts will form the basis for iterative testing cycles. The tasks that will be tested in the first cycle will be provided to research participants with practical workbooks that will be used during the evaluations. These tasks and workbooks will evolve throughout the iterative cycles according to the feedback, implemented changes and evolution of ALFRED apps.

2.2 Timeline Iterative Evaluations

The iterative testing will be carried out in all three end-user countries of the ALFRED project: France, Germany and the Netherlands. There will be at least three different cycles of iterative testing, enabling feedback to technical partners in the different phases throughout the ALFRED system development. As mentioned above, the iterative evaluations are short cycles that are adapted to the results of the technological evaluations. The cycles are planned as follows and can be adapted according to prototypes and progress during the technical work.

- **Pre-prototype evaluations M13-15:** This cycle will evaluate the first outcomes of the technological definitions and early design, before the actual development. These pre-prototypes will consist of a simulation of the speech interface of ALFRED and other tasks that are derived from the use case scripts. In this phase, testing will be limited to the tasks that have the highest priority in the ALFRED context and which are technically and conceptually at a feasible stage for testing. The goal of the evaluation is to test the use and effectiveness of the proposed user interface by the test participants in an early stage. The pre-prototypes will be evaluated in all three countries with a total of 10 older end users in a controlled environment. Within this evaluation all end users will perform identical tasks.
- **First prototype evaluations M18-21:** This cycle will evaluate the results of the initial technological development. The goal of the evaluation is to test the first interaction and the user interfaces by the test participants. They will include the “look and feel” of the final product, but have a simulated back end and lack integration and content since they are at an early stage of development and do not already include all ALFRED functions. The first prototypes will be tested with 10 older end users in a controlled environment in all three countries.
- **Second prototype evaluations M24-26:** This cycle will test the final prototype version that will be used for the pilot evaluations. The prototype contains fully functional features and services, including fully operating backend and content and will be used for pilot sessions after a final usability check in a controlled environment in all pilot countries with 10 older end users.

Figure 1: Timeline of Iterative Evaluations

In each testing cycle, there will be three to four participants per country, so that the total number of participants per cycle will be 10 persons. All Test Participants (TP) match the characteristics of the target group defined in the ALFRED target population (see chapter 3), in order to increase usability and interaction design to a maximum. Furthermore, the iterative testing will be carried out in a controlled environment and with no more than two investigators.

2.3 ALFRED Pillars in the Iterative Testing

During the very first iterative test session, all participants will perform the same test exercises and scenarios, to acquire comparable data from at least 10 participants. In the further iterative test process, there is a possibility that the tested content in the different countries and test locations will vary after the pre-prototype evaluation. This way the test scenarios could already be adapted to the pilot site specific ALFRED pillars (see Table 1):

- **Pillar I: User-Driven Interaction Assistant** to allow older people to talk to ALFRED and to ask questions or define commands in order to solve day-to-day problems.
- **Pillar II: Personalized Social Inclusion** by suggesting social events to older people, taking into account their interests and their social environment.
- **Pillar III:** A more **Effective & Personalized Care** by allowing medical staff and caretakers to access the vital signs of older people monitored by (wearable) sensors.
- **Pillar IV: Physical & Cognitive Impairments Prevention** by way of serious games that help the users to maintain and possibly even improve their physical and cognitive capabilities.

With the more specific focus on the certain pillars, the end-user organisations can focus on their specific use case scenarios which are relevant to their final testing environment and prepare step by step their respective pilot evaluation. For instance, in Germany Charité will have a focus on the ALFRED functionalities related to healthcare as the final evaluation will be performed in a hospital environment. The individualization and adaptation of the use case scenarios will be more detailed as the iterative testing process is launched.

Table 1: Pillar Focus End User Partners

Organisation	ALFRED pillar	ALFRED pillar
NFE	Pillar I	Pillar II
CHA	Pillar III	Pillar IV (in the perspective of rehabilitation)
ESE	Pillar I	Pillar IV (in the perspective of prevention)

2.4 Participants

Each iterative evaluation cycle will involve three to four persons in each pilot country who are stakeholders in ALFRED as final end users. The Test Participants (TP) are older persons (60+) with different socio-economic backgrounds and with different levels of computer literacy and experience of eHealth applications.

The Test Participants will be selected from the target group of ALFRED (see D2.3) through the networks of the end user partners according to their recruiting processes. The TP will give consent to attempt to complete a set of short representative task scenarios presented to them and to provide feedback regarding the usability and acceptability of the user interface. The TP will be directed to provide honest opinions regarding the usability of the application, and to participate in post-session subjective questionnaires and debriefing.

Each evaluation cycle will include 10 Test Participants. According to usability research, the ideal amount of participants in a usability study is 5, regardless of whether websites, PC applications or mobile apps are tested [JN12]. Due to the complex nature of ALFRED solutions and the use of voice interaction, the ALFRED evaluations will nevertheless involve 10 end users across the three countries in each cycle, making sure that all usability errors are detected and a good set of feedback is provided to the technical partners.

2.5 Methodology

The iterative evaluations will be implemented by using a combination of certified and validated methods in order to reach the objectives. The Wizard of Oz method will be used for evaluations of aspects related to voice interaction. The usability and levels of satisfaction will be tested, applying standardized questionnaires. Observation and vocal recording will be used to analyse the interaction of the user with ALFRED. This section introduces each of these methods and describes how they will be applied during the iterative evaluations.

2.5.1 Wizard of Oz

In order to test the use case scripts and requirements of the end users, the Wizard of Oz (WOz) methodology will be used. As the project progresses other methods of testing will

be employed additionally including click dummies, mock ups, paper prototypes, or other semi integrated versions of ALFRED. The specifications on further testing procedures will be developed iteratively as the technical progress of the project advances. The WOz simulation method is a way of prototyping that is widely used by researchers within the field of human computer interaction. The “wizard” in this method is usually played by a person in place of a system component that is not technically finished. This method can simulate e.g. sensor data, contextual information, or system intelligence and basically functions like a mocked up interface controlled by the wizard

In the ALFRED context, the WOz approach can be used to simulate speech recognition, dialogue capabilities and apps. In this setting, the wizard hears what the TP says and selects a response from ALFRED, which is then played back with a speech synthesizer. This way, the TP may still believe that he or she is talking to a fully automated system

The WOz method helps the developers not to be locked up in potentially incorrect assumptions about the users’ preferred mode of interaction. It allows exploratory development and evaluation before investing large amounts of development time in a product that might in the end not meet end user demands. The missing functionality of the tested system which is provided by the “wizard” can be incorporated in the system at later stages of the project [DML05]. A series of WOz iterations has the potential to deliver a more or less complete specification of the system's input/output behaviour which can then be safely implemented.

WOz will be used in ALFRED in a first phase to test the speech interaction with older end users. It will gather information about how the user speaks to ALFRED, in order to guide the design of ALFRED (core and apps). The WOz will also gather recordings to enable evaluations of ASR (speech recognition). Additionally, it enables evaluation of TTS (text-to-speech) and speaker quality by detecting the test participant’s ability to hear and understand what ALFRED said. Furthermore, it enables evaluation of the suitability of some selected utterances by detecting the TP’s ability to understand what ALFRED said and meant.

The participants will be instructed to speak naturally to ALFRED, since natural and intuitive voice interaction is one of the goals of the project. All speech data will be recorded, transcribed and translated from the pilot site language into English by the relevant end user organisation and forwarded to the technical partners for further analysis.

The anticipated WOz method is outlined in more detail below.

Method during task:

- TP is given a smartphone and is instructed to speak into it and listen to its speaker (i.e. no other audio devices are used)
- The smartphone screen is blank and no touch is used (i.e. no push-to-talk or similar)
- The TP is instructed about the task, e.g. sending a message to a contact
- Test leader 1 (TL1) is situated in the same room as TP and prepares the smartphone by starting some app(s) and then disabling the screen (enabling the screensaver)

- Test leader 2 (TL2) is situated in another room, can hear TP's voice as recorded by the smartphone and can select ALFRED utterances to be played back on TP's device
- TL2 initiates the task by selecting some kind of "welcome" utterances
- Each time TP has spoken, TL2 selects a response utterance by clicking in a list of prepared utterances for that task
- When the task has been completed (or some duration threshold has passed TL1 stops the tasks by informing TP, performs some action on the smartphone, and then possibly proceeds to the next task (steps above repeated)
- During each task, VP's voice is automatically recorded (for the whole duration of the task) on the smartphone
- Also, TP's voice + ALFRED's voice is automatically recorded on TL2's device

After the task:

- Test leaders transcribe TL2's audio recording into a text file
- Test leaders translate TL's transcriptions to English
- After the experiment, audio recordings, transcriptions and translations are sent to the technical partners

2.5.2 Controlled Environment

In order to perform the iterative evaluation correctly, the evaluation session will be conducted in a controlled environment without background noise or other disturbing factors during a specified duration of maximum two hours. For recording purposes, video cameras or microphones as well as hand written notes and protocols will be used. As the testing evolves, settings with a more close relation to real life may be chosen. The investigator will instruct the TP about the ALFRED application and clarify that the participants are evaluating the ALFRED application, rather than the investigator evaluating the participant.

2.5.3 Standardized Tasks

Participants will sign an informed consent (see Appendix 1 End User Workbook) that acknowledges that participation is voluntary, that participation can cease at any time, and that the session will be videotaped or recorded but with their privacy of identification safeguarded. The investigator will ask the participant if they have any further questions. At the beginning of the session, the TP will receive a Workbook (see Annex 5 End User Workbook). The Workbook contains all questionnaires and forms that the TP is asked to fill in. It gives detailed instructions to the TP, who can take his/her own time to go through it. With the help of the Workbook, the TP will be able to perform a set of Standardized Tasks independently. The TP can at any moment ask questions or support from the TL1. The workbook will not include any information on how the end user would or should complete the task or scenario. It will give the TP a reason and a goal to perform a task and it lets them show the researchers how they would use the prototype to accomplish that goal without interference.

The Standardized Tasks are simplified assignments derived from the Use Case Scripts and represent different functionalities of ALFRED. The current Use Case Scripts (see Annex 1 to 4) have been selected because of the high priority they have in the ALFRED and will be the basis for the iterative testing. However as the project evolves and technical

innovation and end user feedback becomes available, the Use Case Scripts and Standardized Tasks are likely to change and become more complex as an inherent process within iterative testing.

2.6 Measurements

Throughout the test sessions different measurements will be performed that shape the output of the sessions and are reported to the involved end-user and technical partners. These measurements will lead to a data set that will be analysed by the involved pilot partners.

2.6.1 Observation

The evaluators will video-record test participants' behavior, observing and recording the behavior and comments throughout the usability test. The type of data that will be collected are participants' comments and behavior such as expressions, concentration level, preferences, actions while performing the tasks and opinions about the technology. These recordings can support the researcher's notes if necessary. The researchers additionally take notes while the participants are performing the tasks. Things to look out for include:

- **Navigational problems**
  - What did the participants do?
  - How did they expect the system to respond after their action?
  - What do they search for (e.g. press a certain button, or find a certain UI element) to help them solve their problem?
  - Do they understand what part of the services they are using right now?
- **Functional problems**
  - Do they realize what a certain element does?
  - What do the participants expect to happen when doing certain actions?
  - Are they able to use functions without any problems?
  - Do they understand what certain functions do / mean?
- **Accessibility problems**
  - Are users able to hear the voice output and recognize what is on the screen (text / icons / details)?
  - Is the user able to clearly understand the voice of ALFRED?
  - Is ALFRED able to understand the senior's voice?
  - Do the reactions of ALFRED make contextual sense to the senior's demands?
  - Is the volume of the speech output adequate?

2.6.2 Vocal Recording

Vocal recording of the test session will be performed by audio/videotaping. For the evaluation of the speech interaction vocal recording will be performed to:

- gather information about how the user speaks to ALFRED, in order to improve the design of ALFRED core and apps

- gather recordings to enable evaluations of ASR (speech recognition)
- evaluate TTS (text-to-speech) and speaker quality by detecting the test participant's (TP) ability to hear and understand what ALFRED said
- evaluate the suitability of some selected ALFRED utterances by detecting TP's ability to understand what ALFRED said and meant

2.6.3 Questionnaires

The TP will start with filling out a short questionnaire, containing his/her background information (see Annex 5 End User Workbook). This includes information on living conditions, family situation, technological knowledge, experience and attitude. This information is important to know, not only for the evaluation session, but also for business perspectives and further technological development.

After that, in order to define the perceived ease of use the partners will make use of the ASQ (After Scenario Questionnaire) and PSSUQ (Post-study System Usability Questionnaire) questionnaires to measure different aspects use (see Annex 5 End User Workbook). These usability questionnaires have been validated and are free of charge and are frequently used to assess user satisfaction, system quality, information quality and other items within usability studies.

- **After-Scenario Questionnaire (ASQ):** The ASQ consists of a three-item questionnaire, which measures overall ease of task completion, satisfaction with completion time, and satisfaction with support information. After each task the participant will complete the After Scenario Questionnaire (ASQ) and fill in the questions from the workbook. The overall ASQ score is the average of the responses of the items and provides an indication which tasks are most problematic for participants to execute. The ASQ score ranges from 1 to 7, where 1 is the highest level of satisfaction and 7 the lowest level of satisfaction. The lower the ASQ score, the higher the satisfaction of the end-user. The facilitator will observe and take notes on user behavior, comments and system actions.
- **PSSUQ (Post-study System Usability Questionnaire):** The PSSUQ is a questionnaire designed to assess users' perceived satisfaction with computer systems or applications. Different versions of the PSSUQ are available and it is scientifically adequate to adapt the questionnaire to the specific research topic. The version applied in ALFRED consists of 18 items. Although the versions are different it is still scientifically adequate to compare the gathered scores with each other. The PSSUQ v3 items include four scores: one overall and three subscales. The measured categories are:
  - **Overall:** Average the responses for Items 1 through 18 (all the items)
  - **System Quality (SysQual):** Average Items 1 through 6
  - **Information Quality (InfoQual):** Average Items 7 through 12
  - **Interface Quality (IntQual):** Average Items 13 through 18

It is permitted that practitioners can add items to the questionnaires if there is a need and it is still ensured that the researchers can score the overall PSSUQ scale and subscales, maintaining the advantages of standardized measurement. As a result the PSSUQ was modified by adding two items that consider the voice interaction mode. The PSSUQ score

ranges from 1 to 7, identically as in the ASQ. After all task scenarios are completed, the user will fill in the Post-Study System Usability Questionnaire from the workbook.

2.6.4 Replay-the-Test

Replay-the-Test is a technique which gathers qualitative information regarding the user intents and reasoning during a test. It is a form of the "think aloud protocol" [JR00], but will be performed after the user testing session's activities instead of during them. The "replay the test" procedure can be stimulated by replaying specific sections of the recording and watching it together. After filling in the PSSUQ the researcher will perform a "replay the test" session with the end user. During the "replay the test", the user will be asked to reflect why he/she decided to perform certain interactions and what their reasoning was behind the interaction and what they expected to happen.

2.7 Analysis

The resulting data set has the following parts:

- Summary of the user data from the intake background information form
- Observational remarks by the investigator during the evaluation
- Vocal recording of the interaction
- ASQ scores per task per user
- PSSUQ scores per user
- Researcher's notes within the replay-the-test session

The qualitative data from the researchers' notes will be very useful in understanding if the system needs any improvement (both in function or navigation), and if so, what and how these improvements should be made.

The ASQ scores indicate which tasks were most problematic for participants to execute. The PSSUQ scores give an overall value for the usability of the ALFRED interaction. To give the developers an indication of the problems, the data from the Replay-the-Test procedure and observational notes will be sorted and summarized and the usability errors or problems will be collected. All gathered information during the testing session will enable the researchers to pinpoint problems in the services (user interface, or functionality). This way, a concise list of usability issues can be given to the developers for further improvement.

2.7.1 Documentation

Every pilot site partner will consolidate the notes for each task as well as the general notes of usability problems at the end of the evaluation phase. The pilot partners will:

- Remove duplicates
- Give arguments as to why this was a problem
- If possible / when applicable: give advice on how to solve a certain issue

All the above mentioned information will be entered by every pilot site partner within a user evaluation analysis spreadsheet.

2.7.2 Vocal Recording

Given the central role of vocal interaction in ALFRED, it will be of crucial importance to collect the feedback on the spoken interaction and passing the results to the technical partners. To this end, the interactions of the user with the Wizard of Oz will be recorded and provided to the technical partners as audio files. The recordings of the user with ALFRED will be transcribed and translated from the local language into English. The technical partners will use this data to analyze how the user communicates with ALFRED, to test the participant's ability to hear and understand what ALFRED said and to evaluate the suitability of some selected ALFRED utterances by detecting the participants' ability to understand what ALFRED said and meant. The analyses of spoken interactions will enable improvements and fine-tuning of the speech components as well as the built-in ALFRED apps.

2.8 Testing Procedure

The testing procedure is as follows will have a duration of max. 2 hours and take place in a meeting space (a room with natural day-light)

All material needed for the testing will be provided by the end-user partner that organises the session in each country. All end-user organisations will give identic material at disposal of the TP, to ensure the equal treatment of all TPs. Table 2 details the process for conducting the session and Table 3 gives an overview of the materials needed.

Each individual session will be animated by two Test Leaders (TLs). The TL is among other responsible to help the TP feel comfortable in the testing situation and ensure that the testing goes as planned. All the sessions will be recorded, and therefore an agreement for this is asked from every participant.

Table 2: Duties Involved for the Iterative Testing Session

Duty	Comment
Pre-test arrangements	Have the participant : • Review, sign and give consent to the study and nondisclosure and recording permissions • Fill out the background questionnaires
Introduction to the session (5 minutes)	Explain: • Participant basics of usability testing • Importance of their involvement in the study • TL role • Room configuration, recording systems, observers, etc. • The concrete protocol for the test session • Different study methods, such as thinking aloud, replay the test, WOz
Background interview (5	Discuss the interview with the participants

minutes)	• Experience of using mobile apps • Reasons for using mobile apps
Tasks (60 minutes)	Participants will start with one of the preselected ALFRED task. ASQ will be performed after each task and PSSUQ after all tasks are completed.
Replay-the-Test (30min)	Replay relevant sections of the video material that was recorded during the tasks and elaborate together with the participant.
Refreshments	Some water, coffee, tea and biscuits should be provided for all the participants.

Table 3: Materials for the Iterative Testing Sessions

Material	Comment
Video camera, microphone, Android smartphone, laptop	Additional material may be needed depending on the status of the ALFRED prototype
ALFRED End User Workbook	(see Appendix 1 End User Workbook)
Protocols and questionnaires	(see Appendix 1 End User Workbook)
Participant's nondisclosure form for ALFRED	(see Appendix 1 End User Workbook)
Background Information Sheet About Participant	(see Appendix 1 End User Workbook)
After-Scenario Questionnaire	(see Appendix 1 End User Workbook)
Post System Usability Questionnaire ALFRED End user Workbook	(see Appendix 1 End User Workbook)

2.9 Summary

The iterative testing process is valuable for several reasons. It enables to

- Give continuous feedback from the end-users to the technical partners throughout the technical development

- Ensure that the developed system corresponds to the end-users expectations
- Diminish the workload during the field trial phase as the main components have already been tested with the end-users.
- Plan and prepare efficient field trials that will result in the final evaluation of the ALFRED system.

After the iterative testing cycles have been conducted, the actual pilot evaluations will follow.

3. Pilot Evaluations

The ALFRED field trials will take place in the three end-user countries of the project: France, Germany and the Netherlands. Due to the nature of the project, at this point in time it is not yet clear what technical innovations will be available for the pilot testing. In this chapter we describe the planning of the pilot phases in a general manner that will be detailed in the updated version of the ALFRED pilot plan (D8.2, due M18). The pilot planning is an ongoing process throughout the ALFRED project; as the system development progresses, more relevant and detailed pilot plans will be established.

3.1 Pilot 1 – Individual Usability

After the iterative evaluations the first pilot will start and measure the actual use and usefulness of the ALFRED solutions. The goal is to analyse if the test participants independently use the services regularly in their home environment. The pilot studies evaluate whether the services are useful for older people on a day to day basis, support them in activities of daily living and assess the impact on activities on daily living. This investigation will offer an insight on the completion of the project objectives.

A total of 20 older adults over the age of 60 who live independently at home will be recruited during two consecutive phases. This sample size is large enough to indicate trends of usage and whether specific services demonstrate a problem of use. Each participant uses ALFRED services during four weeks at their own homes and can choose independently which services they want to use. This will enable an objective view about the users' natural reaction to ALFRED.

3.2 Pilot 2 – Hospital Environment

The second pilot will involve older people and their carers within a clinical environment from month 26 of the project and onwards within a non-medical device trial. This pilot will be performed by the Geriatrics Research Group of the Charité Universitätsmedizin Berlin and take place in a clinical environment with a larger group of people and it will focus on the well-being or health conditions of older people, namely the effective and personalized support of elderly and the physical and cognitive impairments prevention with serious games.

The pilot will be performed by the staff of the German Charité hospital and start with the health profile definition for a validation group. Afterwards, a set of non-medical health sensor values will be measured over a period of time and a set of anomaly reports will be simulated. Based on the health profile, serious games will be selected and tested by the users within the course of the pilot.

ALFRED pillars that will be tested in this pilot:

- Pillar III: Effective & Personalized Care
- Pillar IV: Serious Games for Physical & Cognitive Impairments Prevention

With the technological progress of the project the specifications of this pilot will be described in greater detail within the updated version of this deliverable in M18.

3.3 Pilot 3 – Day-to-day Usage

In contrast to the first two pilots, pilot 3 will be performed on a different level of piloting. The pilots of task 8.4 will not be performed by experts, medical staff or trained seniors. Instead, those pilots will be performed by "normal" older people from the E-Seniors association. This pilot will cover all pillars of the project except for pillar III. However, pillar IV may be slightly limited as the health profile will be defined by users and carers and as such, not all functionality of WP7 may be piloted.

3.3.1 Essential of the Pilot

The older persons who will participate in the ALFRED pilot organized by the organisation are voluntary seniors from the association who are between 60 and 95 years old. The shared characteristic of all these test subjects is that they are still actively involved in society and live independently. The persons are in relatively good health state and do not suffer from serious health problems. However, some of them take some medicines that treat age-related illnesses such as high blood pressure, cholesterol, diabetes or osteoporosis.

This approach will allow ALFRED to get real-world feedback of users in their normal environment, especially in the first two pillars. It will allow the project partners to identify usability issues in a very honest and direct way. Within the task, the stakeholders' impressions and experiences will be captured by using different methods (i.e., surveys, focus groups and face-to-face interviews) to assess ALFRED main outcomes, especially with regards to the usability and usefulness of the software development environment, and perceived benefits in the form of its impact.

All participants in the pilots will be trained for the use of the ALFRED solution, so that they can test the solution independently and in the real-life environment. The prototype will be tested with a group of association's members who are eager to try out new technological devices.

3.3.2 Pilot in Two Phases

In a first pilot phase (Pilot Phase 1) the ALFRED solution will be tested by five individual users from the primary target group (i.e. the older persons of the association) in a day-to-day usage for a defined time period. During the testing period, the test subjects are asked to keep a diary about their experiences related to the ALFRED prototype testing period, which will diminish the occurring memory errors in retrospective interviews. After the testing period of the prototype, all the test subjects will be surveyed in order to understand the usability and the usefulness of ALFRED in a day-to-day usage. This phase will be documented and the results are shared among all the project partners.

In the second phase, (Pilot Phase 2), a group discussion will be organised with around 10 users from Pilot 3, where the prototype will be tested and discussed in a group. This session will gather the test participants from phase 1 as well as some of their informal caregivers. The aim of this session is to enable the ALFRD stakeholder groups to share their experience in the usage of ALFRED and record the various reactions and points of view. The session will be recorded and transcribed and all the data will be shared with the project partners.

These mixed methods will enable to gather a wide range of the pilot users' perspectives as well as to verify the usability and usefulness of ALFRED among the different target groups, as the project goes forward and the system technology is developed. These methods will be elaborated further in the updated version of this deliverable in M18.

4. Ethical Issues and Testing of the ALFRED System

As the ALFRED testing phases involve individual participants in three different countries, a common ethical framework is defined. This framework ensures that all the test subjects are handled equally and that their rights are safeguarded during the entire testing procedure.

All persons involved with the usability test are required to adhere to the following ethical key guidelines:

- All participants perform the test on a voluntary basis and after having given their informed consent.
- The performance of any test participant must not be individually attributable. Individual participants' names should not be used in reference outside the testing session.
- All processed test data will be managed safely and used strictly only for scientific and research purposes of the project.
- A description of the participant's performance should not be reported to his or her manager.

Furthermore, the binding European and National regulations and the users' feedback guide the ALFRED consortium in the protection of the test subjects' rights. In this chapter, we will analyze the essential ethical issues and detail the common guidelines that safeguard the individual participants' rights.

4.1 Informed Consent and the Participants' Information about the Project

The ALFRED consortium is aware that the informed consent is an essential part of all individual involvement in the research projects. This chapter firstly defines the most important European regulations guiding the individual participation in the ALFRED test phase and secondly details specific methods related to the users' consent.

4.1.1 Essential European Regulations on the Informed Consent

Charter of Fundamental Rights of the European Union [CFR00] (2000/C 364/01) and more specifically the Article 8 "Protection of personal data" underlines the importance of individuals' consent: "Everyone has the right to the protection of personal data concerning him or her. Such data must be processed fairly for specified purposes and on the basis of the consent of the person concerned or some other legitimate basis laid down by law. Everyone has the right of access to data which has been collected concerning him or her, and the right to have it rectified. Compliance with these rules shall be subject to control by an independent authority."

European Data Protection Directive (95/46/EC) [EDPD95] regulates the processing of personal data within the European Union. The Section 2 "The Criteria for Making Data Processing Legitimate" and especially the Article 7 is essential:

"Member States shall provide that personal data may be processed only if:

- The data subject has unambiguously given his consent; or
- Processing is necessary for the performance of a contract to which the data subject is party or in order to take steps at the request of the data subject prior to entering into a contract; or
- Processing is necessary for compliance with a legal obligation to which the controller is subject; or
- Processing is necessary in order to protect the vital interests of the data subject; or
- Processing is necessary for the performance of a task carried out in the public interest or in the exercise of official authority vested in the controller or in a third party to whom the data are disclosed; or
- Processing is necessary for the purposes of the legitimate interests pursued by the controller or by the third party or parties to whom the data are disclosed, except where such interests are overridden by the interests for fundamental rights and freedoms of the data subject which require protection under Article 1(1).”

4.2 Participants’ Informed Consent in the ALFRED Testing Phase

All the test participants are asked to sign an informed consent form that confirms their voluntary participation and that the participants understand their engagement in the ALFRED project. Obviously, before the informed consent is signed, all the persons will be well informed about the test phase goals and the expectations of their participation in this phase.

In the annexes of this document (see section 6), an example of the informed consent that is used in the ALFRED project can be found. This form will be updated throughout the project so that it is in line with the ALFRED system evolution.

4.3 Personal Data Protection in the ALFRED Pilots

The personal data protection is a crucial aspect of the users’ rights with regards to the new information technologies. Information relating to individuals, called ”**personal data”**, is collected and used in many aspects of everyday life. This data can be anything that identifies individuals, such as a name, a telephone number, or a photo.

The ALFRED project involved the end-users to participate in the project for the first time during the task 2.3 “User Requirements Analysis” during which the project partners deepened their understanding with regards to the target group’s needs, requirements and attitudes. During this project phase, the consortium obtained some important feedback about the end-users’ concerns regarding the processing of their personal data. The essential guideline that the users gave is that the ALFRED system should [KFV14]:

- Ensure confidentiality and protection of personal data (to counteract fear of losing control of personal data).
- Let the user stay in control of personal data.

4.3.1 Legal Framework for the Personal Data Protection

The ALFRED testing phase will keep in line with the two important European texts that guide the protection of personal data within the European Union countries:

Charter of Fundamental Rights of the European Union, (2000/C 364/01): Article 8 – Protection of personal data [CFR00]**:**

1. Everyone has the right to the protection of personal data concerning him or her.
2. Such data must be processed fairly for specified purposes and on the basis of the consent of the person concerned or some other legitimate basis laid down by law. Everyone has the right of access to data which has been collected concerning him or her, and the right to have it rectified.
3. Compliance with these rules shall be subject to control by an independent authority.

European Data Protection Directive (95/46/EC): The Article 6 of the Directive states that personal data must be [EDPD95]**:**

1. Processed fairly and lawfully.
2. Collected for specified, explicit and legitimate purposes and not further processed in a way incompatible with those purposes. Further uses for scientific and statistical purposes are permitted subject to § 46 and 47.
3. Adequate, relevant and not excessive in relation to the purposes for which they are collected and/or further processed.
4. Accurate and, where necessary, kept up to date; every reasonable step must be taken to ensure that data which are inaccurate or incomplete, having regard to the purposes for which they were collected or for which they are further processed, are erased or rectified.
5. Kept in a form that permits identification of data subjects for no longer than is necessary for the purposes for which the data were collected or for which they are further processed. Member States shall lay down appropriate safeguards for personal data stored for longer periods for historical, statistical or scientific use.

Furthermore, in line with the Article 7 of the Directive, all processed personal data will be collected during the ALFRED project only with the given consent of the data subject.

4.3.2 Personal Data Protection in the ALFRED Test Phase

All personal data that might be used in the ALFRED test phase will be handled on the user's agreement. Before the test, all the participants will be well informed about the goals and their engagement in the ALFRED test phase and the will have an opportunity to ask questions. Once the test subjects have a clear idea about their engagement and participation they are asked to sign in an informed consent form that notably specifies the issues related to the processing of the personal data.

Furthermore, all personal data is kept anonymous and managed in a secure manner by the test facilitators. All the anonymous personal data will be used strictly for research and scientific purposes in the framework on the ALFRED project.

4.4 Respect of Privacy and Private Life during the ALFRED Test Phase

The notions of the private life and privacy are closely linked with the protection of the personal data that was analysed in the previous section. As the European and the national legislations underline the importance of the individual's private life and privacy in various

fundamental legislative texts, this chapter analyses the private life and privacy issues in a more detailed manner.

In order to understand the issues of this section, two key notions should be defined:

- **Private Life** [IHRC14]**:** The definition of private life is rather open in the international legislations; this notion concerns the individual's freedoms, family and home. As a result, the right to private life includes a wide range of overlapping and interrelated rights protecting the individual's freedom. Moreover, the right to privacy is the right to individual autonomy. The right to privacy encompasses the right to protection of a person's intimacy, identity, name, gender, honour, dignity, appearance, feelings and sexual orientation and extends to the home, the family and correspondence.
- **Personal Privacy**: The right to protection of a person's privacy (i.e. the individual's intimacy, name, gender, honour, dignity, appearance, feelings and sexual orientation and their home environment, the family and correspondence) are strictly related to the right for private life.

4.4.1 Respect of the Private Life and Privacy in the ALFRED Test Phase

The older adults will use the ALFRED system in their home environment or a real-world environment in order to improve their daily living. The test facilitators will respect the participants' private life and notably they will neither share any sensitive participant data without the test subject's consent nor intrude in the test subject's home environment without their permission that is given in the informed consent form.

4.5 Ethical Committee at Charité (Germany)

According to the regulatory processes of the Charité a data protection vote of the Charité for all test that involve users will be obtained. Additionally, an ethical vote may be required.

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Annex 1: Use Case Scripts Pillar I

Script#	1		
Main Use Story ID:	US036		
Secondary use story ID	US018, US037, US065, US066		
Use Case Name:	Wake up call (check on health status)		
Created By:	CHA	Last Updated By:	
Date Created:	25-07-2014	Date Last Updated:	
Involved technical partner:	AITEX, ASC, TALK, (TIE)		

Involved persona:	Hilde the Older person
Description:	Hilde uses ALFRED to be woken up in the morning.
Task:	“Please set up a time for a wake-up call on ALFRED.”
Trigger	Hilde wants to wake up at a designated time.
Preconditions:	Hilde has ALFRED installed on her smartphone, or other device.
Priority:	1
Normal Course of Events:	1. Hilde: ”ALFRED I would like a wake-up call.” 2. ALFRED: “At what time and date would you like the wake-up call?” 3. Hilde: “On the….day/month/year….at….xx:xx o’clock.” 4. ALFRED: ”Ok Hilde I have set the Alarm for day/month/year….at….xx:xx o’clock.” 5. The alarm of ALFRED rings at the preset time. 6. ALFRED: “Good morning Hilde. Are you feeling ok this morning?”
Alternative Courses:	Hilde does not know the current date. 1. Hilde: ”Sorry ALFRED, I don’t know what date it is.” 2. ALFRED: ”Today is the day/month/year.” 3. Hilde: “Thank you ALFRED, please set the alarm for day/month/year….at….xx:xx o’clock.”
Exceptions:	
Tested outcomes:	Primary goals: - Does ALFRED set the time and date correctly?

	- Does the alarm ring at the set time? Secondary goals: - Is the alarm signal at an appropriate loudness - Is the alarm signal pleasant
Includes:	Speech interaction, intelligent agent, calendar
Possible usability metrics:	Scenario completion, critical errors, non-critical errors, ASQ questionnaire
Assumptions:	
Notes and Issues:	
Indicator:	
Importance(+/+++++):	+++++
Time of Implementation:	M12

Script#	2		
Main use Story ID:	US039		
Secondary use Story ID:	US038, US041		
Use Case Name:	Navigation		
Created By:	NFE	Last Updated By:	
Date Created:	25-07-2014	Date Last Updated:	
Involved technical partner:	ASCORA, TALK		

Involved persona:	Hilde the older person
Description:	Hilde is going to an art exhibition in the city center in the modern art museum. She wants to take the public transport. She uses ALFRED to navigate to the center.
Task:	'Please use ALFRED to navigate to the museum."
Trigger	Hilde wants to go to the museum.
Preconditions:	Hilde has ALFRED installed on her phone.
Priority:	1
Normal Course of	1. Hilde clicks the PTT.

Events:	2. Hilde: “ALFRED navigate me to the modern art museum in the city centre.” 3. ALFRED: “Do you mean the Modern Art Museum on the Vredenburgplein?” 4. Hilde: “Yes.” 5. ALFRED: “What means of transport do you use?” 6. Hilde: “Public transport.” 7. ALFRED: “With public transport it will take you 35 minutes to arrive at your destination. Do you want to proceed?” 8. Hilde: “Yes.” 9. ALFRED: “You should take bus 5 to the central station at 15:10. There is a 5 minute walk to the bus stop’. Shall I navigate you now?” 10. Hilde: “Yes, please.” 11. ALFRED: ‘”Go to your left to the end of the street.” 12. ALFRED: “Turn right now.” 13. ALFRED: “Walk 80 meters; you will see the bus stop at your right hand. The bus will arrive in 7 minutes.”
Alternative Courses:	7. Hilde: “No, it takes too long. Please call a taxi.” 8. ALFRED: “Calling a taxi.”
Exceptions:	
Tested outcomes:	Test the correct sequence of the navigation. Test the use of ALFRED voice interaction outside of the home. Is ALFRED able to navigate sufficiently accurate to go by foot to a destination? Is ALFRED able to use the public transport information to guide transfers, etc.?
Includes:	Speech interaction, call a taxi, navigation
Possible usability metrics:	Scenario completion, critical errors, non-critical errors, ASQ questionnaire
Assumptions:	
Notes and Issues:	Future use case script can include a sequence with the event management (US072) and agenda management (US065).
Indicator:	
Importance(+/+++++):	+++
Time of Implementation:	M12

Script#	3		
Main Use Story ID:	US053		
Secondary Use Story ID:	US018, ,US54, US055, US065, US066		
Use Case Name:	Medicine reminder		
Created By:	CHA	Last Updated By:	
Date Created:	25-07-2014	Date Last Updated:	
Involved technical partner:	TUDA, AITEX, ASC, TALK, (TIE)		

Involved persona:	Otto the Older person
Description:	Otto uses ALFRED to be reminded of his medication intake.
Task:	'Use ALFRED to be reminded if you have taken your medication today.'
Trigger	Otto wants to check if he has taken his pills.
Preconditions:	Medication intake (pills, dosage, time of the intake) is preset in ALFRED.
Priority:	1
Normal Course of Events:	1. ALFRED: "Otto, I would like to remind you take your medication today." 2. ALFRED shows data about medication (pills, dosage, and time of the intake) on the display. 3. Otto, confirms the intake of each substance by pointing on a symbol on the ALFRED display, after he has taken each medication. 4. ALFRED: "Thank you Otto, you have taken all pills, have a good day."
Alternative Courses:	1. Otto has forgotten to take one or more medications (has not confirmed the intake, by tapping the item on the display). 2. ALFRED: "Otto, I have noticed that you have not confirmed the intake of medication xyz, could you please check if you have taken this medication already. 3. Otto checks and confirms; reminder is off. 4. Otto does not confirm; reminder stays on.
Exceptions:	The reminders should be phrased in a way that does not

	encourage potential overdoses. It might not be possible to display graphical content on ALFRED and reminder function will be plain speech content.
Tested outcomes:	Primary goals: - Does ALFRED remind at the right time and of the correct medication details (pills, dosage, time of the intake)
Includes:	
Possible usability metrics:	Scenario completion, critical errors, non-critical errors, ASQ questionnaire, Time on Task
Assumptions:	
Notes and Issues:	Include later US022, US006
Indicator:	
Importance(+/+++++):	++++++
Time of Implementation:	M12

Script#	4		
Main Use Story ID:	US057		
Secondary Use Story ID			
Use Case Name:	Messages		
Created By:	ESE	Last Updated By:	
Date Created:	29-07-2014	Date Last Updated:	
Involved technical partner:	TALK		

Involved persona:	Olivia the Older Person, Carl the Informal Carer
Description:	Olivia sends a message to Carl with ALFRED to give her news.
Task:	Use ALFRED to send a message to a contact.
Trigger	Carl wants to see how Olivia is doing.
Preconditions:	Olivia and Carl have ALFRED installed in their smartphones, Smartphone has a working network and data connection, ALFRED knows Carl's contact number.
Priority:	1

Normal Course of Events:	1. Olivia activates ALFRED. 2. Olivia: “ALFRED, send a message.” 3. ALFRED opens the message window and gets ready to write down the message that Olivia will spell. 4. Olivia “ALFRED, write down: I am doing well today! Could you bring a bottle of milk on your way back home?” 5. ALFRED types down the message Olivia spelled and then it reads it aloud to Olivia. 6. ALFRED repeats the written message “I am doing well today! Could you bring a bottle of milk on your way back home?”, and asks “Is this correct?” 7. Olivia: “Yes ALFRED. Send the message to Carl.” 8. ALFRED sends the text message to Carl’s smartphone.
Alternative Courses:	5. ALFRED does not understand what Olivia told him to write down the message. 6. ALFRED: “Could you please repeat your message.” 7. Olivia: “I am doing well today! Could you bring a bottle of milk on your way back home?” 7. ALFRED misrecognizes the message and says "I am doing laundry today. Could you break a battle on the back home?" 8. ALFRED:”Is the message spelled correct? 9. Olivia: „No, please call Carl”. 10. The contact is called.
Exceptions:	
Tested outcomes:	- Is the voice interaction natural? - Is the sequence logical? - Is ALFRED able to write down and send a dictated message? - Is ALFRED able to find the right contact based on the indications of the older person
Includes:	Speech interaction, message function, contact list
Possible usability metrics:	Scenario completion, critical errors, non-critical errors, ASQ questionnaire
Assumptions:	
Notes and Issues:	- The next use case script “Call Someone” is closely related to this use case script. - The following User stories, with lower priorities, could be included in the script:

	○ US025 with Priority 2 “Repeat” ○ US028 with Priority 2 “Communication with Entourage” ○ US049 with Priority 2 “Emergency 1” ○ US064 with Priority 2 “Contacts” ○ US018 with Priority 3 “Visual Support” ○ US051 with Priority 3 “Emergency III”
Indicator:	
Importance(+/+++++):	+++
Time of Implementation:	M12

Annex 2: Use Case Scripts Pillar II

Script#	5		
Main Use Story ID:	US062		
Secondary Use Story ID:	US057, US028		
Use Case Name:	Call someone		
Created By:	NFE	Last Updated By:	
Date Created:	25-07-2014	Date Last Updated:	
Involved technical partner:	TALK, ATOS		

Involved persona:	Hilde the Older person
Description:	Hilde uses ALFRED to call her family and friends and send messages, making it easy for her to keep contact, stay social and get help if necessary.
Task:	“Please use ALFRED to contact your daughter.”
Trigger:	Hilde wants to call her daughter
Preconditions:	Hilde has added her contacts to ALFRED.
Priority:	1
Normal Course of Events:	1. Hilde clicks PTT. 2. Hilde: “ALFRED, please call my daughter.” 3. ALFRED: “Calling your daughter.” 4. The contact is called.
Alternative Courses:	4. ALFRED does not know who Hilde`s daughter is. 5. ALFRED: “What is your daughter’s name? 6. Hilde: Lisa 7. ALFRED: “Calling Lisa.” 8. The contact is called.
	9. Contact does not answer the phone. 10. Hilde: ALFRED I want to send a message to my daughter. 11. ALFRED: “OK, you can dictate your message.” 12. Hilde dictates message.
Exceptions:	
Tested outcomes:	- Is the voice interaction natural?

	- Is the sequence logical? - Is ALFRED able to find the right contact based on the indications of the older person?
Includes:	
Possible usability metrics:	Scenario completion, critical errors, non-critical errors, ASQ questionnaire
Assumptions:	
Notes and Issues:	The use case script can be extended with sequences on video calls (US050), single button calling (US083) and maintaining the contact list (US064)
Indicator:	
Importance(+/+++++):	++++
Time of Implementation:	M12

Script#	6		
Main use Story ID:	US063		
Secondary use Story ID:			
Use Case Name:	Activation of vocal interaction with ALFRED (testing various modalities to activate ALFRED e.g. push-to-talk, big red button, hardware button)		
Created By:	ESE	Last Updated By:	
Date Created:	29-07-2014	Date Last Updated:	
Involved technical partner:	ASC		

Involved persona:	Hilde the Older Person / All the involved personas
Description:	The user activates the vocal interaction mode with ALFRED by pushing one specific single button
Task:	Activation of vocal interaction with ALFRED
Trigger	The user wants to start talking with ALFRED.
Preconditions:	- The User has ALFRED installed on the smartphone/mobile device. - The user wants to activate the vocal interaction with ALFRED.
Priority:	1

Normal Course of Events:	1. User turns ALFRED on. 2. ALFRED is turned on. 3. The User wants to talk with ALFRED and he/she pushes on the big and clear button that appears on the screen when ALFRED turned on 4. ALFRED: “Hello, how can I help you today?” 5. User: “Hello ALFRED...” 6. The user starts the other specific task with ALFRED.
Alternative Courses:	1. ALFRED is already turned on. 2. The user sees the vocal interaction activation button clearly displayed on the ALFRED screen.
Exceptions:	
Tested outcomes:	- Is ALFRED easy to turn on? - Is the one specific button well visible and easy to find? - Is the vocal interaction mode possible to be activated with one button?
Includes:	ALFRED system on/off, visual support
Possible usability metrics:	Scenario completion, critical errors, non-critical errors, ASQ questionnaire
Assumptions:	
Notes and Issues:	This use case script could be included in the begging of each prototype testing session
Indicator:	
Importance(+/+++++):	++++
Time of Implementation:	M12

Script#	7		
Main use Story ID:	US067		
Secondary use story ID:	US065		
Use Case Name:	Manage my agenda		
Created By:	NFE	Last Updated By:	
Date Created:	25-07-2014	Date Last Updated:	
Involved	TUDA, ASCORA		

technical partner:	

Involved persona:	Otto the older person
Description:	Otto receives reminders from ALFRED on the appointments that he has added in his agenda.
Task:	Please add a reminder to your agenda for a meeting with your friend Steve.
Trigger	Meeting with Steve
Preconditions:	Otto maintains his agenda in ALFRED
Priority:	2
Normal Course of Events:	1. Otto clicks PTT. 2. Otto: "ALFRED please adds a meeting to my agenda." 3. ALFRED: "What day?" 4. Otto: "Monday 3rd of October." 5. ALFRED: "What time?" 6. Otto: "15:00" 7. ALFRED: "What is the meeting about?" 8. Otto: "Pool with Steve at the activity centre." 9. ALFRED: "Meeting is saved. Do you want a reminder?" 10. Otto: "Yes." 11. ALFRED: "For when?" 12. Otto: "The same day at 10:00h in the morning." 13. ALFRED: "Reminder set."
Alternative Courses:	9. ALFRED: "Meeting is saved. Do you want a reminder?" 10. Otto: "What are my appointments for the whole week?" 11. ALFRED: "You have a meeting at 15.00 and a gym class on Thursday at 11.00"
Exceptions:	
Tested outcomes:	- Test the sequence. - Test the agenda options. - Test the verbal reminder of the agenda.
Includes:	
Possible usability metrics:	Scenario completion, critical errors, non-critical errors, ASQ questionnaire
Assumptions:	
Notes and Issues:	
Indicator:	

Importance(+/+++++):	+++
Time of Implementation:	M?

Script#	9		
Main Use Story ID:	US072		
Secondary Use Story ID:	US073, US074, US080		
Use Case Name:	Learn about art and exhibitions		
Created By:	NFE	Last Updated By:	
Date Created:	28-07-2014	Date Last Updated:	
Involved technical partner:	ASC		

Involved persona:	Otto the older person
Description:	Otto receives suggestions from ALFRED on a daily basis to motivate him and stay active.
Task:	React on a suggestion of ALFRED for a social event.
Trigger	ALFRED detects a social event.
Preconditions:	ALFRED mines the events in the area of Otto's town.
Priority:	2
Normal Course of Events:	1. ALFRED gives a notification tone. 2. ALFRED: "I have found a new event in your neighbourhood." 3. Otto: "What is the event?" 4. ALFRED: "Next Friday there is a pool competition at the activity centre." 5. Otto: "OK, do you have more information on this event?" 6. ALFRED: "The event is at 15:00 h. Steve is going as well. Registration is required by e-mail." 7. Otto: "Ok ALFRED, please register me." 8. ALFRED: "Registration at the event confirmed."
Alternative Courses:	4. Otto: "I am not interested." 5. ALFRED: "Ok Otto."

Exceptions:	
Tested outcomes:	Test the sequences. Test of ALFRED detects the right events. Test if ALFRED suggests the right events.
Includes:	
Possible usability metrics:	Scenario completion, critical errors, non-critical errors, ASQ questionnaire, Time on Task
Assumptions:	
Notes and Issues:	A similar sequence can be made with expositions and museums (US072), social activities (US073), invitation (US074)
Indicator:	
Importance(+/+++++):	++++(use case is also in the DoW)
Time of Implementation:	M13

Annex 3: Use Case Scripts Pillar III

Script#	8		
Main Use Story ID:	US087		
Secondary Use Story ID:	US90, US091, US096		
Use Case Name:	See own vital parameters		
Created By:	CHA	Last Updated By:	
Date Created:	25-07-2014	Date Last Updated:	
Involved technical partner:	AITEX		

Involved persona:	Otto the Older Person
Description:	Otto uses ALFRED to check on his vital parameters.
Task:	Please use ALFRED to check on your vital parameters.
Trigger	Otto wants to check his vital parameters.
Preconditions:	Otto has ALFRED installed on his smartphone, Shirt with vital sensors integrated (Smartshirt)
Priority:	1
Normal Course of Events:	Otto:"ALFRED please show me my vital parameters." ALFRED:"Ok Otto, what would you like to see, your body temperature, heart rate or data about your skin conduction?" Otto: "I would like to see……." ALFRED: "It is displayed on the screen." Otto:"Thank you ALFRED."
Alternative Courses:	ALFRED cannot detect any data or improbable data.
Exceptions:	
Tested outcomes:	Primary goals: - Validity of the obtained data - Clarity of presentation
Includes:	Speech interaction, intelligent agent, Smartshirt
Possible usability metrics:	Scenario completion, critical errors, non-critical errors, ASQ questionnaire, Time on Task

Assumptions:	
Notes and Issues:	Later US022
Indicator:	
Importance(+/+++++):	+++++
Time of Implementation:	M12

Annex 4: Use Case Scripts Pillar IV

Script#	10		
Main Use Story ID:	US098		
Secondary Use Story ID:			
Use Case Name:	Motivation of New Activities		
Created By:	ESE	Last Updated By:	
Date Created:	29-07-2014	Date Last Updated:	
Involved technical partner:	TUDA, ASC		

Involved persona:	Olivia the Older Person
Description:	ALFRED suggests different games to Olivia, for physical and cognitive stimulation.
Task:	ALFRED suggests Olivia to play game that stimulates her body and mind. Olivia will select the most motivating game and play it.
Trigger	ALFRED offers interesting and motivating games.
Preconditions:	- Olivia has ALFRED installed in her mobile device. - ALFRED is turned on. - Olivia is motivated and willing to play a game. - Olivia is physically able to play a game with ALFRED.
Priority:	1
Normal Course of Events:	1. Olivia: “ALFRED, please propose a game to play.” 2. ALFRED: “Hello Olivia! You can choose your game from between physical or cognitive games. What would you like?.” 3. Olivia:” I am not sure yet, please let me know what is available” 4. ALFRED tells Olivia a selection of few different games that are classified either physically or cognitively simulative. 5. Olivia selects a game that seems appropriate and motivating for her.

	6. Olivia: “ALFRED I want to play the memory stimulating game.” 7. ALFRED: “Alright, I will now open the game for you. Get yourself ready to see the game on the screen.” 8. Olivia puts her eyeglasses on and accepts the game invitation. 9. Olivia starts playing the game that has several different matches. 10. All matches are finished and Olivia has played enough. 11. Olivia: “ALFRED please closes the game.” 12. ALFRED turns the game off but saves Olivia’s game results in the App so that she can compare her results whenever.
Alternative Courses:	Many possibilities to be discussed (on other game, different game modes, on a screen???...)
Exceptions:	
Tested outcomes:	- Is ALFRED able to propose motivating and interesting games? - Can the user easily choose the most interesting game? - Is the level of the game adapted for the user? - Is the game duration convenient for the user? - Is the user satisfied with the selected game? - Can ALFRED record the game results?
Includes:	Game manager, vocal interaction - Could include the contact list if some games are multiplayer
Possible usability metrics:	Scenario completion, critical errors, non-critical errors, ASQ questionnaire
Assumptions:	
Notes and Issues:	The following user stories could also be included in this use case script: o US104 Good Posture with priority 1 o US101 Use of Health Data in Serious Games with priority 2 o US102 Games for interests with priority 2 o US105 Regular Exercise reminder, priority 2 o US107 Evaluating Games, priority 2 o US112 Varied Exercise I, priority 2 o US113 Varied Exercise I, priority 2 o US115 Summary of Exercise, priority 2 o US117 Mind stimulating games, priority 2 o US099 Limited Serious Games duration priority 3

	○ US100 Use of Imagination, priority 3 ○ US108 Training for muscles I, priority 3 ○ US109 Training for muscles II, priority 3 ○ US110 Results of Exercise, priority 3 ○ US111 Daily changing exercise, priority 3 ○ US116 Games for Care, priority 3 ○ US118 Feedback for right exercise, priority 3
Indicator:	
Importance(+/+++++):	++++
Time of Implementation:	M12

Annex 5 End User Workbook

Logo pilot organization

ALFRED

Personal Interactive Assistant for Independent Living and Active Ageing

End-User workbook

Introduction

Thank you for participating in the ALFRED research project. With your help we will be able to develop a new innovative product that can help older people live longer independently at home.

In this session we are testing the first ALFRED services that are still partly unfinished. The session will give us insight in the workings of the ALFRED services and the interaction with the services. The test will take approximately 2 hours. Please remember that we are in no way testing your skills or technical capabilities. It is not necessary to have specific knowledge to use ALFRED and we will do our best so that you are as comfortable as possible. Do not hesitate to ask anything to our researchers.

This workbook contains the questionnaires for the research. First of all you will be asked to read and sign an informed consent. After that there is a small questionnaire that helps us to obtain more background information. Then you will find a set of tasks that you are asked to perform with the ALFRED system on a mobile phone, using speech. After each task you fill in a few questions. The work book contains a closing questionnaires with multiple choice questions. Finally we will have a short interview.

Informed consent for participation in the ALFRED services evaluation

I volunteer to participate in the ALFRED evaluation study. The purpose and objective of this investigation is to evaluate prototypes of the ALFRED project on a mobile device with speech interaction. The anticipated benefits of this study are the understanding of how users will work with the virtual butler so that this product can be improved.

I understand and agree that personal information about me and my interaction with the ALFRED apps will be collected during this investigation, which will be used and processed (manually and/or by computer) by the researcher responsible for this investigation.

I understand that pictures, video-files or audio recording depicting my work with the equipment during this testing session will be used only for the accomplishment of project's goals and only by the project partners.

I also understand that all the collected information will remain anonymous. The data acquired will be used to evaluate the ALFRED services. The data will not be used in any way outside the scope of the ALFRED research project. I understand that I am entitled to access the personal information collected about me and to have inaccuracies corrected.

I am aware that participation in this investigation is completely voluntary. Furthermore, I realize that I may decide to refuse participation or stop participation at any time, without providing reason. I will indicate the researcher if I wish to stop.

I understand that I am entitled to signal, discuss and solve any possible unwanted situation by contacting the principal investigator of the pilot site at the helpdesk

I agree to participate in this investigation.

Name:

Place:

Date:

Signature:

Intake questions

1. Family name:	
2. Gender:	☐ Female ☐ Male
3. Year of birth:	
4. Nationality:	
5. Household Income:	☐ 500 – 1000 € ☐ 1000 – 2000 € ☐ 2000 – 3000 € ☐ > 3000 €
6. Marital status	☐ Single ☐ Married ☐ Divorced ☐ Widowed
7. Living situation	☐ Living alone ☐ Living with children ☐ Living with partner, no children ☐ Living with partner and children
8. Education (highest level, whether or not completed)	☐ Primary education ☐ Lower vocational training ☐ Intermediate vocational 4raining ☐ Intermediate secondary training ☐ Higher secondary education ☐ Higher vocational training ☐ University
9. Employment:	☐ Retired ☐ Employed ☐ Unemployed

	☐ Voluntary work ☐ Other
10. Residential situation	☐ Living independently at home ☐ Independent planned housing, congregate housing ☐ Home for older people
11. Self-rated health	☐ Poor ☐ Not so good ☐ Fair ☐ Good ☐ Very good
12. Vision: Is your eyesight good enough to read ordinary newspaper print? (with glasses if usually worn)	☐ Yes without difficulty ☐ Yes, with minor difficulty ☐ Yes, with major difficulty ☐ No, not able to
13. Hearing: Do you hear what is said in a normal conversation with 3 or 4 other persons? (with hearing aid if you wear one)	☐ Yes without difficulty ☐ Yes, with minor difficulty ☐ Yes, with major difficulty ☐ No, not able to
14. Motor control: Can you press small items like buttons on a remote control?	☐ Yes without difficulty ☐ Yes, with minor difficulty ☐ Yes, with major difficulty ☐ No, not able to
15. Self-rated mobility level	☐ Poor ☐ Not so good ☐ Fair ☐ Good

	☐ Very good
16. What is your technological experience?	
☐ **Very high:** I use different devices on a daily basis to get onto the internet. I use different applications, such as e-mail, whats-app, social networks, etc. ☐ **High:** I use on a daily basis internet and e-mail. ☐ **Medium:** I have a PC and I use it a few times a week. ☐ **Low:** I have a PC but I hardly use it and do not feel like it to use it more. ☐ **Very low:** I do not have a PC or internet and have never or very rarely used any technological devices.	
17. What is your attitude towards technology?	
☐ **Positive:** I don't mind trying out new devices when they are handed to me. ☐ **Neutral:** I don't know or I don't really care. ☐ **Negative:** I don't like technology and stay far away from it.	
18. Your use of ICT Tools (computer, smartphone, tablets):	
☐Daily Use ☐Weekly Use ☐Monthly Use ☐Rarely ☐ Never	
19. What type of phone do you use?	

☐ Normal mobile phone
☐ Senior mobile phone (with big buttons)
☐ Smartphone (Android, e.g. Samsung)
☐ Smart phone (Apple)
☐ Other:

20. Please indicate which of the following online activities you have undertaken in the last 30 days on your mobile phone:

☐ E-mail
☐ Chat (whatsapp)
☐ Look up a recipe
☐ Web search
☐ Look for health/medical information
☐ Look for information on a hobby or interest
☐ Look for transport information
☐ Look on a map for directions
☐ News
☐ Weather
☐ Sports
☐ Online banking
☐ Shopping
☐ Playing games
☐ Job search
☐ Financial/stock trading
☐ Visit a local, state or federal government website
☐ Other:

Tasks and ASQ Questionnaires

On the next pages you will find 6 tasks. Please try to perform these tasks as good as you can. It is important to know that we are not testing you, nor your knowledge or your skills, but purely the ALFRED services.

Task 1: First of all, in order to start using ALFRED, you will have to active it. Please activate ALFRED.

Overall, I am satisfied with the ease of use of the application for completing this task.

- I completely agree
- I agree
- I agree a bit
- Neutral/no opinion
- I disagree a bit
- I disagree
- I completely disagree

Overall, I am satisfied with the amount of time it took me to perform this task with the application.

- I completely agree
- I agree
- I agree a bit
- Neutral/no opinion
- I disagree a bit
- I disagree
- I completely disagree

Overall, I am satisfied with the supporting information (help function, on-screen messages and other documentation. NOT the instructor!) of the application for completing this task.

- I completely agree
- I agree
- I agree a bit
- Neutral/no opinion
- I disagree a bit
- I disagree
- I completely disagree

Comments:
Please write down any comments about this task and/or the system below

Task 2: One of the things that ALFRED can do for you, is helping you to wake up by means of an alarm clock. Please set an alarm for tomorrow morning, 8:30 AM.

Questionnaire
Please mark the answer that is most fitting for you

Overall, I am satisfied with the ease of use of the application for completing this task.

- I completely agree
- I agree
- I agree a bit
- Neutral/no opinion
- I disagree a bit
- I disagree
- I completely disagree

Overall, I am satisfied with the amount of time it took me to perform this task with the application.

- I completely agree
- I agree
- I agree a bit
- Neutral/no opinion
- I disagree a bit
- I disagree
- I completely disagree

Overall, I am satisfied with the supporting information (help function, on-screen messages and other documentation. NOT the instructor!) of the application for completing this task.

- I completely agree
- I agree
- I agree a bit
- Neutral/no opinion
- I disagree a bit
- I disagree
- I completely disagree

Comments:
Please write down any comments about this task and/or the system below

Task 3: ALFRED can help you send messages. Imagine that you have a neighbour named Carl, who works in a grocery store. Send Carl a message, asking him if he can bring you a bottle of milk on his way back home.

Questionnaire
Please mark the answer that is most fitting for you

Overall, I am satisfied with the ease of use of the application for completing this task.

- I completely agree
- I agree
- I agree a bit
- Neutral/no opinion
- I disagree a bit
- I disagree
- I completely disagree

Overall, I am satisfied with the amount of time it took me to perform this task with the application.

- I completely agree
- I agree
- I agree a bit
- Neutral/no opinion
- I disagree a bit
- I disagree
- I completely disagree

Overall, I am satisfied with the supporting information (help function, on-screen messages and other documentation. NOT the instructor!) of the application for completing this task.

- I completely agree
- I agree
- I agree a bit
- Neutral/no opinion
- I disagree a bit
- I disagree
- I completely disagree

Comments:
Please write down any comments about this task and/or the system below

Task 4: Next to setting an alarm clock and sending messages, ALFRED can also be used to call someone. Use ALFRED to contact your friend Lisa.

Questionnaire
Please mark the answer that is most fitting for you

Overall, I am satisfied with the ease of use of the application for completing this task.

- I completely agree
- I agree
- I agree a bit
- Neutral/no opinion
- I disagree a bit
- I disagree
- I completely disagree

Overall, I am satisfied with the amount of time it took me to perform this task with the application.

- I completely agree
- I agree
- I agree a bit
- Neutral/no opinion
- I disagree a bit
- I disagree
- I completely disagree

Overall, I am satisfied with the supporting information (help function, on-screen messages and other documentation. NOT the instructor!) of the application for completing this task.

- I completely agree
- I agree
- I agree a bit
- Neutral/no opinion
- I disagree a bit
- I disagree
- I completely disagree

Comments:
Please write down any comments about this task and/or the system below

Task 5: You can also use ALFRED to keep an agenda. Please add a reminder to your agenda for a meeting with your friend Steve next week on Tuesday 14:00.

Questionnaire
Please mark the answer that is most fitting for you

Overall, I am satisfied with the ease of use of the application for completing this task.

- I completely agree
- I agree
- I agree a bit
- Neutral/no opinion
- I disagree a bit
- I disagree
- I completely disagree

Overall, I am satisfied with the amount of time it took me to perform this task with the application.

- I completely agree
- I agree
- I agree a bit
- Neutral/no opinion
- I disagree a bit
- I disagree
- I completely disagree

(see next page!)

Overall, I am satisfied with the supporting information (help function, on-screen messages and other documentation. NOT the instructor!) of the application for completing this task.

- I completely agree
- I agree
- I agree a bit
- Neutral/no opinion
- I disagree a bit
- I disagree
- I completely disagree

Comments:
Please write down any comments about this task and/or the system below

Task 6: ALFRED also gives automatic suggestions to you. Please wait for a moment and react on ALFRED.

Questionnaire
Please mark the answer that is most fitting for you

Overall, I am satisfied with the ease of use of the application for completing this task.

- I completely agree
- I agree
- I agree a bit
- Neutral/no opinion
- I disagree a bit
- I disagree
- I completely disagree

Overall, I am satisfied with the amount of time it took me to perform this task with the application.

- I completely agree
- I agree
- I agree a bit
- Neutral/no opinion
- I disagree a bit
- I disagree
- I completely disagree

(see next page!)

Overall, I am satisfied with the supporting information (help function, on-screen messages and other documentation. NOT the instructor!) of the application for completing this task.

- I completely agree
- I agree
- I agree a bit
- Neutral/no opinion
- I disagree a bit
- I disagree
- I completely disagree

Comments:
Please write down any comments about this task and/or the system below

Post Study System Usability Questionnaire

You just finished all tasks, well done! What follows is a questionnaire containing 18 questions about your overall experience with ALFRED. Again, please mark the answer that applies the most to you.

1. Overall, I am satisfied with how easy it is to use this system.

- I completely agree
- I agree
- I agree a bit
- Neutral/no opinion
- I disagree a bit
- I disagree
- I completely disagree

2. It was simple to use this system.

- I completely agree
- I agree
- I agree a bit
- Neutral/no opinion
- I disagree a bit
- I disagree
- I completely disagree

3. I was able to complete the tasks and scenarios quickly using this system.

- I completely agree
- I agree
- I agree a bit
- Neutral/no opinion
- I disagree a bit
- I disagree
- I completely disagree

(see next page!)

4. I felt comfortable using this system.

- I completely agree
- I agree
- I agree a bit
- Neutral/no opinion
- I disagree a bit
- I disagree
- I completely disagree

5. It was easy to learn to use this system.

- I completely agree
- I agree
- I agree a bit
- Neutral/no opinion
- I disagree a bit
- I disagree
- I completely disagree

6. I believe I could become productive quickly using this system.

- I completely agree
- I agree
- I agree a bit
- Neutral/no opinion
- I disagree a bit
- I disagree
- I completely disagree

(see next page!)

7. The system gave error messages that clearly told me how to fix problems.

- I completely agree
- I agree
- I agree a bit
- Neutral/no opinion
- I disagree a bit
- I disagree
- I completely disagree

8. Whenever I made a mistake using the system, I could recover easily and quickly.

- I completely agree
- I agree
- I agree a bit
- Neutral/no opinion
- I disagree a bit
- I disagree
- I completely disagree

9. The information (such as online help, on-screen messages and other documentation) provided with this system was clear.

- I completely agree
- I agree
- I agree a bit
- Neutral/no opinion
- I disagree a bit
- I disagree
- I completely disagree

(see next page!)

10. It was easy to find the information I needed.

- I completely agree
- I agree
- I agree a bit
- Neutral/no opinion
- I disagree a bit
- I disagree
- I completely disagree

11. The information was effective in helping me complete the tasks and scenarios.

- I completely agree
- I agree
- I agree a bit
- Neutral/no opinion
- I disagree a bit
- I disagree
- I completely disagree

12. The organization of information by voice interaction was clear.

- I completely agree
- I agree
- I agree a bit
- Neutral/no opinion
- I disagree a bit
- I disagree
- I completely disagree

(see next page!)

13. The interface (voice interaction) of this system was pleasant.

- I completely agree
- I agree

- I agree a bit
- Neutral/no opinion
- I disagree a bit
- I disagree
- I completely disagree

14. I liked using the voice interaction of this system.

- I completely agree
- I agree
- I agree a bit
- Neutral/no opinion
- I disagree a bit
- I disagree
- I completely disagree

15. This system has all the functions and capabilities I expect it to have.

- I completely agree
- I agree
- I agree a bit
- Neutral/no opinion
- I disagree a bit
- I disagree
- I completely disagree

(see next page!)

16. Overall, I am satisfied with this system.

- I completely agree
- I agree

- I agree a bit
- Neutral/no opinion
- I disagree a bit
- I disagree
- I completely disagree

17. The vocal instructions were understandable.

- I completely agree
- I agree
- I agree a bit
- Neutral/no opinion
- I disagree a bit
- I disagree
- I completely disagree

18. The audio volume was sufficient.

- I completely agree
- I agree
- I agree a bit
- Neutral/no opinion
- I disagree a bit
- I disagree
- I completely disagree

This is the end of the questionnaire. Thank you for helping us!