Deliverable 2.2

End User Requirements Specifications

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Abstract

This user requirements documentation describes the process of gathering information from user requirements and the process of features chosen during the first two phases.

Due to the delay of recruiting all end users and non complete availability of the evaluated test results M0/1, here is presented an intermediate report, showing the next steps for improvement of the MyLifeMyWay system.

This report will be updated as soon the end user inputs are completely available after the testing phase M0/1.

What's new since MTR in November 2017

One of the action points coming from the MTR in November 2017 was, to clearly state, what are the end user requirements for phase 2 of the project. The decision on the realization of the prioritized features was started in November 2017 and finalized just before Xmas 2017. Subsequently the implementation of phase 2 was pushed, in order to start the second field test round timely in April 2017.

Summarizing this is a new version (V2.0) deliverable, with the current valid content for field tests 2. The preliminary version 1.0 was a proposal from the developers from iHomeLab – serving as discussion base for the whole project team.

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Version	*Date*	*Changes*	*Name*	*Organisation*
0.9	2018-02-07	Initial Creation	Daniel Bolliger	iHomeLab
1.0	2017-10-10	Update Mid Term Review	Daniel Bolliger	iHomeLab
2.0	2018-02-07	Update Mid Term Review II	Sylvia Hoekstra	HAN

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1 Executive Summary

To develop a personal assistant (PA) Anne which meets the needs of the end-users and end-user organisations, requirements are collected in all three phases of development of Anne.

All available feedback for user requirements from end users and consortium partners was collected out of the brainstorm/kickoff meeting, questionnaires, interviews and focus groups. Also information during the testing phase from coordinators and volunteers gave valuable input. At the start of the project, Anne (V0) was delivered with three features: general agenda (calendar), medical agenda and (reading the local) news. Data are collected which expectations the end-users had (M0) and what they experienced after several weeks/months of using Anne (M1). Requirements which features desired by end-users and end-user organisations are collected for the next phase (II). Then a proposal was made for feature list phase II and IIb (home- automation only in Switzerland) and discussed within the consortium. A decision was made for a prioritised and consolidated list in order to develop features in time and within the budget and planning for the next two phases.

2 Introduction

The end users and end user organisations play the central role for the development of Anne in MLMW. The feature set and usability must meet their expectations and wishes. If not the product will not be used. Therefore it is very important after selection of the end-users, to keep in close contact with them to know what their needs are. The starting point is the kick off meeting which delivered an outcome of desired possibilities. To get the end user requirements, interviews, focus groups and questionnaires are held at the start (M0-measurement) and eight weeks to six months) after using Anne (M1).

The goal of this document is, to give a proposal for the further development of Anne in the next phases. This proposal was developed and discussed with the following partners: VIR, BON, HAN, UCLL, and IHL. This proposal will be discussed and adapted by the whole consortium and will lead to a common agreed development of features and release planning and prioritization during the stakeholders meeting of the project MLMW.

This document describes the most desired end user features, improvement of existing features which lead to a better usability. Criteria to meet are end users and end user organizations have maximal benefit with Anne, the development efforts do not explode and we comply with the project proposal.

3 Stake Holder Categories

There are four different stakeholder categories relevant for the evolution of the features in the project MLMW. They have different needs and wishes. For the development, all these different views have to be aligned, in order to have a well-balanced overall system.

3.1 Primary End User

The primary end-users are persons fitting the inclusion criteria (fragile, but not too fragile). They are the main end-users for MLMW, having a windows tablet with running Anne system. They are also registered end-users with a 'dashboard account' of Anne with medication, news, product settings etc. For each primary end user there is also a responsible end user organisation available.

3.2 Secondary End User

Persons with a link to the primary end-users. It is the nonprofessional ecosystem of a specific end-user. This can be children, relatives and friends. They do not have a user account in the 'dashboard' and not a computer provided by the project. This means they have a By Your Own (BYO) device with a running app/login to have communication with the primary end-users.

3.3 End User Organisation

End-user organisations are organisations with close professional contact to the primary end-users. In our project the organisations are: bonacasa (Switzerland), community of Deventer (The Netherlands), Trivium Meulenbelt Zorg (The Netherlands) and Senior Living Group (Belgium). They represent stakeholders that want to use/utilise Anne for their customer relation (incl. backend processes). They have their specific (end user *organisational*) requests to the system. It can be another perspective to the same features, as their primary users. It has to be defined, if they need the same hardware and user account(s) as the primary end user has.

3.4 Development Partner

All visible features need a backend and supporting processes too. They have to be developed in parallel or prior to the visible features. Especially this is the case for components, that are system relevant and not only bound to one feature. These components have also to be started early (e.g. home automation), in order to collect information from the project internal parties and not yet from all end users end-customers (develop something that can be shown to focus groups and end user organisations).

3.5 Funding Agency

The funding agencies have approved the project proposal submitted by the consortium. The promises there are integral part of the funding scheme. Therefore, we have to stick to the promises therein as close as possible. If we change the target of the project, we have to state the reasons for the changes to the CMU and let it approve there. We as consortium are measured in the mid- and final review on our deliverables against the approved project proposal

4 Brain Storm Workshop in the Consortium

Anne has at the start of the project (march 2016) three functionalities: general agenda, medical agenda and (reading) the news. During the project MyLifeMyWay, new features will be developed and added in close co-creation with the developing partners. To know what the potential requirements are, during the kick off meeting a workshop with brain-storm of possible features of Anne was held with primarily the end-user organisations, supported by the researchers and the developers of the product. In order to get as much rich ideas the members of the consortium split up in two groups. This resulted in a list of possibilities (not prioritised) as described below.

4.1 Results brainstorm end-user organisations

End-Users 1

- Shopping
- Connected with existing local service centre
- Meals on wheels
- Entertainment (for instance music, e-books, photos, videos, puzzles, polygon)
- Case management (<-informal care giver)
- Connected with family what's app group
- Connected with informal care platform (like eff care zorgt.)
- Connected with local newspaper etc. -> Anne can read these aloud
- Reading articles etc. forwarded by family
- Connected with obli/ warning to drink regularly
- Warning informal care when no reaction during the day
- Help functionality/alarm function

End-User 2

- Reminder and information -> calendar
- Structuring the day
- Local information (Strategic and dynamic/actual)
- Information about for instance transport, weather
- Activity board (passive and active)
- Video conferencing
- Integrating domotica: webcam/intercom -> heating, light, blinds
- Remote control tv/radio/video/…
- Temperature/outside-inside
- Direct contact with service provider/administrator -> facility manager
- Help-button -> helpdesk -> explanation video
- Power information

After this brain storm inventarisation, the consortium discussed what is necessary and realistic now to deliver for phase I.
Anne has already the possibility to show and read the general agenda (Calendar), Medical Agenda and showing and reading the News. There has to be done some testing on adequacy and response on touch screen and spoken commands. Anne is available in the

Dutch language. So there has to be developed and tested a version in German language. To get everything stable in a technical way is a point of attention. Video-call is a strong wish of specific the municipality of Deventer but from a technical point this could not be possible to deliver at the first testing phase. The video call will be of high priority to develop already during phase I in order to have it operational to roll out phase II.

5 Available Systems Functionality before involvement of the end users

The basic system of Anne is available with the features Calendar, News, Medical agenda plus the whole backend system. The calendar shows the end user all items placed in here like appointments with the doctor, hospital, hairdresser, lunch, coffee- or tee guests, etc. Anne reminds by speech (15 minutes or if desired more/less time) the end user to this appointment. Medical agenda shows (integrated in calendar) the medications which has to be taken at a certain hour. Anne reminds by speech the end user before, during and after this specific timeslot until the end user makes a (vocal) notification of having taken the medication. News: a selection of customised (local) news is made with the end user. Anne reads the new loud in the preferred language Dutch or German. She can be selective to skip or read a specific item asked by the end user.

Anne is personalised with a photograph and presented as shown here.

For the testing phase I the following quick guide and command list is developed in Dutch and English language.

Knoppen/Afbeeldingenlijst/Buttons

Raak onderstaande afbeeldingen op het scherm aan om Anne hiermee opdrachten te laten uitvoeren: Touch the pictures below in order to get Anne at work


Start


pauzestand/pause


Afspeelstand/play


Microfoon uit/out


Microfoon aan/on


Vraagteken/help

Agenda/calendar

Nieuws/news

Lees/read item 1,2,3,4,5,6,7,8
Lees/read artikel 1,2,3,4,5,6,7,8
Volgende/next artikel
Vorige/earlyer artikel
Kun je alles voorlezen?/Can you read all?
Lees alles/ Read all

Startscherm/home

Luister Anne: zet Anne AAN/ listen Anne: activates Anne

(Dank je Anne: zet Anne UIT)/ Thanks Anne: de-activates Anne

Vraagteken/question mark

Open Informatie/ Open Information

Wat kan ik doen hier?/ What can I do here?

Datum en tijd/Date and time

Luister Anne/listen Anne

Welke dag is het vandaag?/ Which day is today?

Welke datum is het?/ Which date is it?

Hoe laat is het?/ How late is it?

Wat is de tijd? /What's the time?

Agenda/calendar

Luister Anne/Listen Anne

Open Agenda/Open Calendar

Wat zijn mijn afspraken voor vandaag?/What are my appointments today?

Wat zijn mijn afspraken voor morgen?/ What are my appointments tomorrow?

Wat is mijn volgende afspraak?/ What 's my next appointment?

Wanneer heb ik [afspraak/gebeurtenis]?/ When do I have [appointment/happening]?

Hoe laat moet ik naar [afspraak/gebeurtenis]?/ What time do I have [appointment/happening]?

Medicatie/ Medication

Luister Anne/ Listen Anne

Open Agenda/ Open Agenda

Wat voor medicijn moet ik nemen?/ Which medication do I have to take?

Wanneer moet ik mijn medicijn nemen?/When do I have to take my medication?

Nieuws/News

Luister Anne: Listen Anne

Open Nieuws: Open news

Volgende pagina/Next page

Vorige pagina/ Earlyer page

Lees item/Read item: 1,2,3,4,5,6,7,8

Lees artikel/Read article: 1,2,3,4,5,6,7,8

Volgende artikel/ Next article

Vorige artikel/ Earlyer article

Kun je alles voorlezen?/ Can you read everything?

Lees alles/ Read everything

6 Primary End User Requirements

To get insight about the expectations of the features at start of the project from the end users, information is gathered before Anne was rolled out (M0). Specific questions were asked in electronic questionnaire which features the end user would expect to use most or

least. In interviews and focus groups more rich information about the expectations was derived. After the use of Anne (eight weeks up to six months) again interviews and focus groups are held in order to find out what the perceived use of this features was and what new features are desired (M1). The most important results are briefly described below. For detailed results of the M0 and M1 we refer to D5.4.

6.1 User Satisfaction of Current Features

At this moment only in Switzerland the M1 questionnaire was completed. The Swiss end users (N=10) answered the questionnaire M1 after eight weeks up to six months using the features. The following outcomes are reported:

- 10 end-users are satisfied with the use of the feature news, only 1 respondent report that he/she is absolutely not happy with this feature.
- In addition, almost all end-users (N=10 respectively N=9) are happy (or very happy) with reading the news and reading the general agenda by Anne.
- End-users are less positive about adding appointments in the general agenda; 4 end-users report that this feature does not meet their expectations, 7 end-users are satisfied with this function.
- Reading the news by Anne is the most used feature of the end-users (N=9), the use of the medication agenda is not so popular (N=9).
- 6 of 11 end-users are satisfied of the reaction of Anne on commands and questions, 7 persons are positive about the recall of their medication by Anne, and 7 are also happy about the support (of Virtask) in the use of Anne.

The M1 interviews and focus groups confirmed the results of the quantitative outcomes. In general there is a wide range of reactions about the use of functions, but the general agenda shows to be the most useful thus far for the Swiss end-users. Similar outcomes are described in the Netherlands. In Deventer en TMZ also the news was the most popular although there were serious comments on performance like speech/pronunciation. The medication agenda was in advance a desired feature but during the use of it, this function did not meet the expectation because of lack of reliability (fi. reminder in time) and difficulty to fill in the dashboard.

Improvement of usability current features

The end-users came up with a lot advices to improve the usability of current features. These are described and shown with possible solutions.

- Make microphone state clickable, in addition to the speech commands ‘hallo Anne‘ and ‘danke‘. With this additional option the system can be waked up.
- Distinguish graphically what icons and regions are clickable and which are not. Proposal underlay the clickable area with a light colour shade, which can be configured in the dashboard.

sample for clickable icons	sample for non clickable icons

Figure 1 Clickable and non Cliclable Regions

6.1.1 Context Sensitive Available Speech Commands

Give the user a dynamical list of available commands that is context sensitive. This additional list of available speech commands can be displayed on request on each site. The speech command for this action could be the key-word 'commands' and the clickable icon on the upper right side of each site as displayed in the following figure:

Figure 2 Commands Context Sensitive Invocation Icon

If the key-word 'commands' is initiated or the icon is clicked, a dynamic list with available speech commands is displayed. The most probable command is highlighted. All items are clickable.

Figure 3 Clickable Speech Commands - Popup

After clicking one list item or sending a speech command, the list is automatically collapsed. The list is also collapsed by touching the commands icon or after XX-seconds idle time.

6.1.2 System Information – Current Status

Missing feedback of the system is one of the most alienating issue of the current system version. Moreover it really lowers the usability experience very much.

Our proposal is to have an additional option that can show the current action and speech recognition of the system in an easy way for the user

- Have an additional 'ear' icon on the upper right. By clicking (clicking only) a running text line is shown on the lower part of Anne, providing actual system information

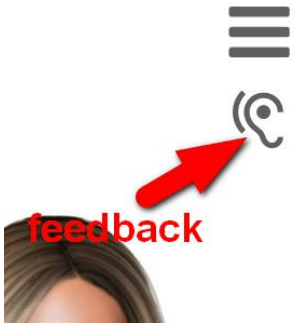

Figure 4 Clickable Feedback Button

- Recognised speech inputs are displayed with a coloured smiley (red – to low acceptance, or/and not understood, yellow critical acceptance and text, green with recognized command. Additionally log messages can be displayed in this line as we have it already in javascript-console (ctr-alt-i)
- Make the output graphically coloured, depending on the operation status

Figure 5 System Feedback Qualified with Emoticons and Colors

6.2 End User Organisation Needs

The needs of the end user organisations are specified by the stakeholders of the end user organisations during several stakeholder meetings. Bonacasa had a special meeting within their organisation and collected also specific information on technical requirements.

6.2.1 Bonacasa

6.2.1.1 Service Channel Contact

- Call-back request feature
- Kind of combox function for missed calls etc
- End user organisation PC-Interface for communication (Video, Audio)
- Backend app video channel
- Common Phone backend...

6.2.1.2 Service Channel News (Special RSS Channel for end user organisation)

- End user organisation RSS Feed creation channel

6.2.2 Senior Living Group

- The current applications are too much "nice things to have".

- Future feature: Communication with the family (a kind of low-threshold skype)
- Future feature: purchasing services and goods in a safe and easy way would be an added value. (Cf. Cubigo application used in Ter Bleuk, http://www.cubigo.com/en)
- Future feature: photo's and video's, logbook

6.2.3 TMZ and Deventer

End-user organisation in Deventer prioritised the development and testing of video call for the next phase II. As a municipality with home dwelling elderly who stay longer independent in the community it is important to support them to have a social life (by videocall) with each other and with the community centre "Fountain". They would also like features which could support hobbies, like reading, playing games and so one. But these ones are "nice to have" but less important.

6.3 Development Needs iHomeLab

The feature home automation will be developed in close collaboration with Virtask only for Switzerland (bonacasa/iHomelab). This will be tested in the last test version: phase III. Dutch and Belgian end user organisations will not realise this feature because they do not have the necessary infrastructure needed for this aplication (Conform proposal).

6.3.1 Home Automation

First interaction between Anne and HAG (home automation gateway). Needed for interface development and focus group. In this stage one configuration can be programmed static. In the next release configuration date will be handed over to Anne dynamically and the home automation page will be built up also dynamically.

6.3.2 Door Automation

First integration of separate stream door automation (door switch, audio, video). This will be programmed with a separate piece of SW as described in the HAG-Architecture document.

6.3.3 Speech training gamification (localisation)

One goal of the proposal MLMW is to have increased dialect recognition with Anne. At the moment we do not support this feature. The following idea might be useful for operating Anne with any dialect:

We rely on command based operating. Therefore is only a limited set of commands available, that Anne has to recognize reliable. Maybe we can train Anne in interaction with the user.

- The user is displayed a command on the screen
- She/he has to speak it out several times until this command is trained for this specific user

- In order to make this not boring, the training of all key words can be integrated into a game. When achieving some level it is possible to switch from the untrained to the trained version.

6.3.4 Big Data Analysis and Feedback

- Adaptations in data acquisition and server API, when needed for data analysis
- Feedbackloop will not yet be established from Engie to Virtask server in this release yet.

7 Criteria for Definition of additional Features of Anne

7.1 End User Perspective

Feedback given on the existing V0 of Anne (during the first field test period: phase I) on general and specific usability have to be taken into account with high priority. This is important because:

- the user experience with the improvements directly that they can influence the project. This is highly motivating
- Often the usability increases significant by putting small development effort to a specific point (low hanging fruits)
- Make the whole system more attractive, by adding the most wanted missing features. So the users are encouraged to use the system in their daily life.

7.2 End User Organisation Perspective

Give the end user organisations added value with Anne, try to make their life more easy for them by supporting their business processes. Facilitate communication with their clients, which use Anne.

7.3 Effort and Timeline

Bringing together all the desirability from sections 7.1 to 7.3 there is a long 'wish list'. This list has to be prioritized against the following aspects:

- What has the highest impact to improve the acceptance/attractiveness/use to the majority of all stakeholders?
- What *can* be done with the available development resources in the project flow?
- How the developed features can be bundled in meaningful packages?

7.4 Funding Perspective

We have given in our accepted project proposal different key points, which have to be full filled towards our funding agencies. Scientific goals and challenges are also comprised therein:

- Personal virtual avatar

- Different languages
- Home automation
- Collaborative artificial intelligence

8 Consolidated Prioritised Feature List

As discussed in the previous chapters, it is essential to choose the next feature set in a way to maximise the attractiveness for all stakeholders, while keeping the development effort (and delivery schedule) at an acceptable level. So for discussion/decision in the consortium the following set is proposed.

Take into account, that video call and home automation at current state are advanced quite far already, so this must be feasible to deliver this features in time planned for phase II and IIb. The backend features are important to leverage the attractiveness for end user organisations.

Meanwhile improvements of currently available features and usability enhancements have a big attractiveness impact of the whole system.

This resulted in the next proposal for a feature list, visualised in

Almost available	Moderate effort	Develop from scratch
Video call	End User Organization specific page	Usability: Context-Sensitive Speech Commands
Domotica prototype	Usability: Clickable vs. non clickable	System Information – Feedback dialogues
General improvements existing features	Calendar and Medication improvements	New feature: weather forecast
	News: commands and layout	New feature: Card games
		New feature: Listen to news or Podcasts
		New feature: Listen to radio station
		Read aloud: Texts ebooks recipes

Proposal desirable features Anne

The consortium decided during a stakeholder meeting (20 December 2017) to choose for improving and developing the following features phase II:

- Improvement of usability in general (language, performance, minor improvements)
- Improvement of existing features (general agenda, medical agenda, news)
- New feature Videocall
- New feature Gaming

- New feature Radio

To give an idea what and how these features would like, the next slides give a more specific visualised view.

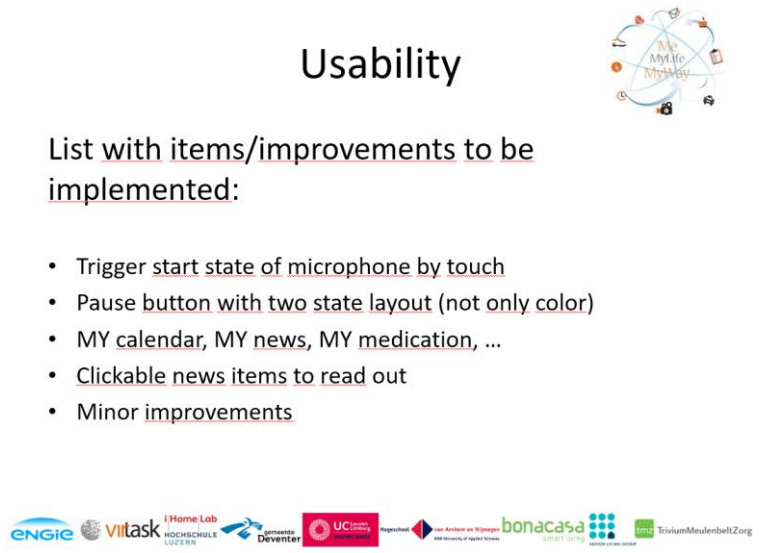

Figure 6: Usability Improvements

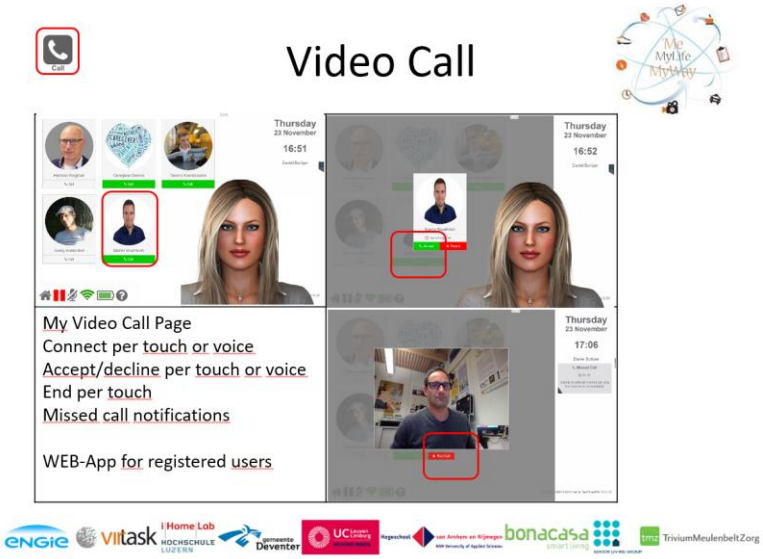

Figure 7: Video Calling Functionality

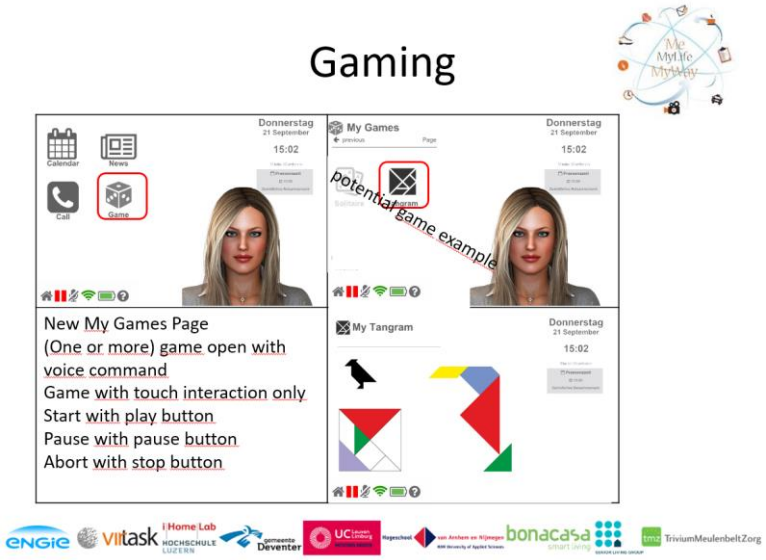

Figure 8: Gaming Functionality

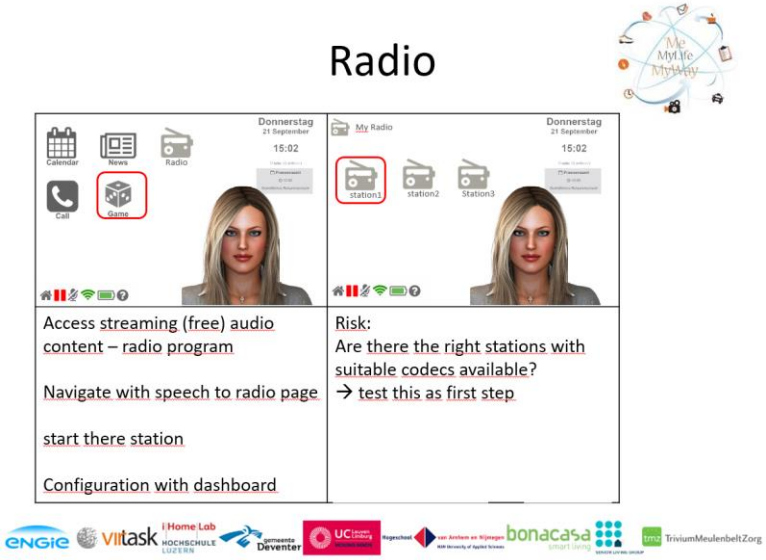

Figure 9: Radio Functionality

For the Phase IIb the home automation users (only in Switzerland) will have additional to the features above the following functionality available in summer 2018:

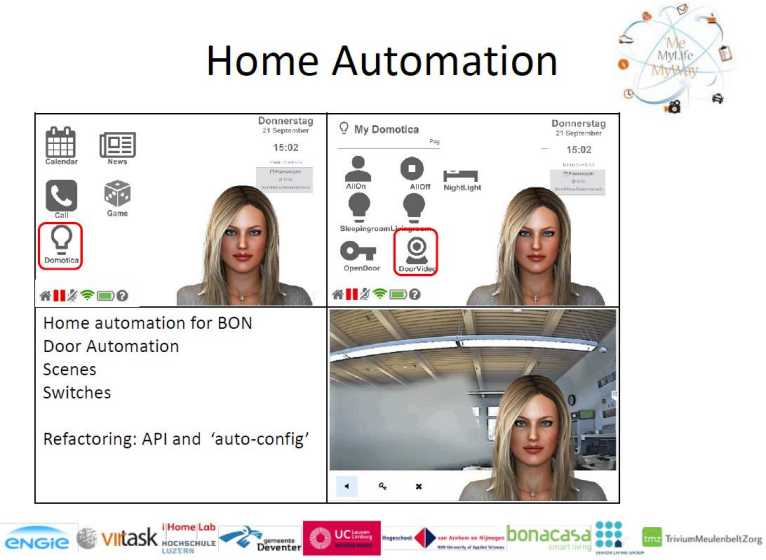

Figure 10: Home Automation

The final release will be available in January 2019 for the end users. The planned features set will be:

Figure 11: Planned Feature Set Phase III

The details for Usability+ and Games+ and additional features will be defined with the outcome of the research activities of Phase II and the strong inclusion of our end users. This is scheduled in the period may-november 2018.

A decision is already made on the service page feature. This feature cannot be implemented already in phase II. Architectural reasons require a refactoring of some parts of the code. In order not compromise SW stability of Phase II the consortium moved this feature to Phase III.

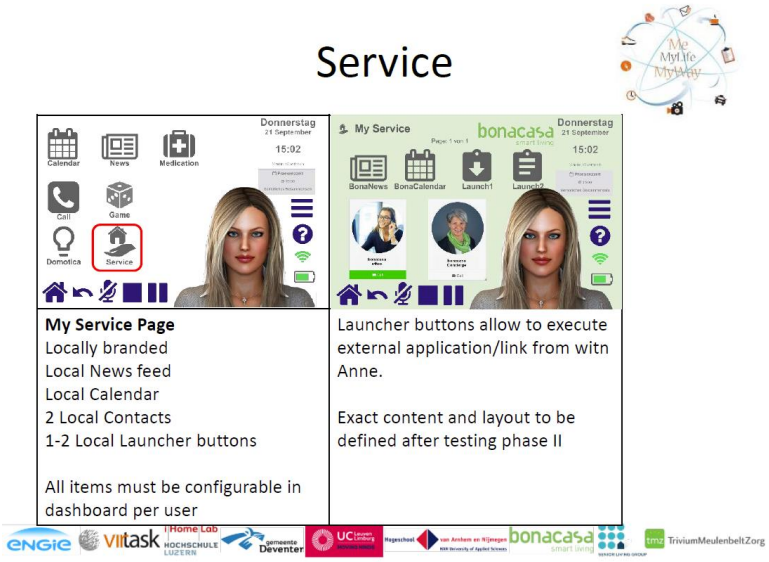

Figure 12: Service Page Functionality for Phase III