



Project Number AAL-  
2016-049

Active and Assisted Living Programme  
AAL-2016 – Living with Dementia



***“CARELINK for Dementia suffers and their community”***

**Deliverable D4.2**  
**Test Scenarios Specification**

**Work package:** WP4 – Management

<b>Prepared By/Enquiries To:</b>	Gary McManus ( gmcmanus@tssg.org) – TSSG, WIT
<b>Reviewer:</b>	David Fuchs (Akaber), Christine O’Meara (WIT)
<b>Status:</b>	FINAL
<b>Date:</b>	01/10/2020
<b>Version:</b>	1
<b>Classification:</b>	FINAL

**Authorised by:**

Gary McManus  
TSSG-WIT





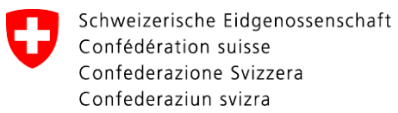
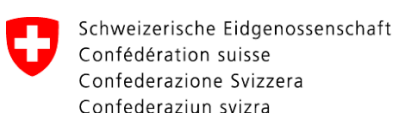
**Reviewed by:**

David Fuchs  
Akademie Berlingen

**Authorised date:** \_01\_/\_10\_/\_2020\_

## Project Funding Support

This project would not be possible without the support of the Ambient Assisted Living Joint Programme. The work has been promoted under the project CARELINK, AAL-CALL-2016-049 funded by AAL JP, and co-funded by the European Commission and National Funding Authorities of Ireland, Belgium, Portugal and Switzerland.

Partner	Country	National Funding Body	Logo
WATERFORD INSTITUTE OF TECHNOLOGY (WIT)	IRELAND	ENTERPRISE IRELAND	
INSTITUTO DE DESENVOLVIMENTO DE NOVAS TECNOLOGIAS (UNINOVIA)	PORTUGAL	FUNDAÇÃO PARA A CIÊNCIA E A TECNOLOGIA	
U-SENTRIC	BELGIUM	IWT AGENTSCHAP VOOR INNOVATIE DOOR WETENSCHAP EN TECHNOLOGIE	
OPEN SKY DATA SYSTEMS LTD	IRELAND	ENTERPRISE IRELAND	
AKADEMIE BERLINGEN	SWITZERLAND	FEDERAL DEPARTMENT OF ECONOMIC AFFAIRS, EDUCATION AND RESEARCH EAER	
CREAGY AG	SWITZERLAND	FEDERAL DEPARTMENT OF ECONOMIC AFFAIRS, EDUCATION AND RESEARCH EAER	

## Disclaimer:

This document reflects only authors' views. Every effort is made to ensure that all statements and information contained herein are accurate. However, the Partners accept no liability for any error or omission in the same. EC or AAL is not liable for any use that may be done of the information contained therein.


© Copyright in the document remains vested in the Project Partners.

## CARELINK Project Profile

**Contract No.:**
**AAL-2016-049**

<b>Acronym:</b>	Carelink.
<b>Title:</b>	CARELINK for Dementia sufferers and their community.
<b>URL:</b>	<a href="http://www.carelink-aal.org">www.carelink-aal.org</a>
<b>Twitter</b>	@Carelink_AAL
<b>LinkedIn Group</b>	Carelink
<b>Facebook Page</b>	www.facebook.com/Carelink
<b>Start Date:</b>	01/08/2017
<b>Duration:</b>	30 months

### Partners

	WATERFORD INSTITUTE OF TECHNOLOGY (WIT) – [COORDINATOR]	IRELAND
	UNINOVA – INSTITUTO DE DESENVOLVIMENTO DE NOVAS TECNOLOGIAS (UNI)	PORTUGAL
	U-SENTRIC (USE)	BELGIUM
	OPEN SKY DATA SYSTEMS LTD (OSD)	IRELAND
	AKADEMIE BERLINGEN (AKA)	SWITZERLAND
	CREAGY AG (CRE)	SWITZERLAND

Active and Assisted Living Programme  
AAL-2016 – Living with Dementia

### **Document Control**

This deliverable is the responsibility of the Work Package Leader. It is subject to internal review and formal authorisation procedures in line with ISO 9001 international quality standard procedures.

Version	Date	Author(s)	Change Details
0.1	25/10/2018	Gary McManus	Table of Content.
0.2	01/11/2018	Gary McManus	Draft for review.
0.3	08/11/2018	Gary McManus	Version Complete
1.0	10/11/2018	Gary McManus	Approved version release.
<b>FINAL</b>	01/10/2020	Gary McManus	Final Release Approved

## Executive Summary

### Objectives

This deliverable introduces the scenarios that were created to ensure that the trials, as described in D.4.3 will be set up as realistically as possible and that they will capture what is needed to assess whether or not the end users' needs and wishes are met with the Carelink solution. To do so, the scenarios are based on the user requirements gathered early on in the project in WP2 as well as ongoing efforts (also WP2) of gathering user feedback on the concept for the Carelink solution. The concept is developed by the Carelink team, based on the user requirements as well as business insights (WP5), technical possibilities (WP3) and the actual technical setup that will be feasible to have ready for the field trials as described in D.4.1. The test scenarios will describe a realistic end-to-end flow from users' first contact with Carelink to a successful recovery of a Person with Dementia after a wandering episode. The scenarios will describe all steps from a user's perspective, but also focus on all the touchpoints where the Carelink solution has a role to play. This way the scenarios set the stage for what end users need and want and form the basis for validating their satisfaction with Carelink's proposed solution. Based on the type of trials that will be set up, as described in D.4.3, the scenarios will be elaborated further to create test scenarios that can be used during the field trials.

<b>1</b>	<b>INTRODUCTION .....</b>	<b>7</b>
<b>2</b>	<b>ABBREVIATIONS AND ACRONYMS .....</b>	<b>8</b>
<b>3</b>	<b>Software Testing and Field Trial concept.....</b>	<b>9</b>
<b>3.1</b>	<b>Software Testing.....</b>	<b>9</b>
<b>3.2</b>	<b>Field trials.....</b>	<b>9</b>
<b>3.3</b>	<b>Test Scenarios for Software Testing and the Field Trials .....</b>	<b>11</b>
<b>4</b>	<b>Hardware Testing.....</b>	<b>22</b>
<b>4.1</b>	<b>Methodology for energy consumption testing .....</b>	<b>22</b>
<b>5</b>	<b>CONCLUSIONS .....</b>	<b>23</b>

## 1 INTRODUCTION

---

The consortium has made a clear difference between software and hardware testing and field trials. The software and hardware testing will be carried out at the development sites with specific software and hardware test teams before it will be tested by the users. Software and hardware testing ensure that the system works according to the documented requirements and specifications (D2.1 and D4.1):

- Does the application work?
- Is all the specified functionality available?
- Are there any defects and bugs?
- Are there any performance and speed problems?

Field trials are used for two primary reasons:

1. To evaluate the usability of the system
  - Are the end users able to use the services?
  - Are the services easy to use?
  - Are there any barriers?
2. To evaluate the services of the system themselves
  - Is this something our end users would use?
  - Do the services provide value to the end users?
  - Would they recommend the services?
  - For what reasons?
  - What additional features would they like to see?

The CARELINK consortium used these two methodologies in the project, and it was decided early on that a successful Software and Hardware testing exercise is a prerequisite for any field trials, because end user time and goodwill is very precious - there is no value to let real end users find obvious problems and bugs in the service.

## 2 ABBREVIATIONS AND ACRONYMS

---

Abbreviation	Description
WPL	Work Package Lead
PMB	Project Management Board
PM	Project Manager
QM	Quality Manager
TM	Technical Manager



### 3 Software Testing and Field Trial concept

---

#### 3.1 Software Testing

For the software testing phase an iterative scenario-based approach is used. Scenario testing is a software testing activity that uses scenarios: hypothetical stories to help the tester work through a complex problem or test system. The ideal scenario test is a credible, complex, compelling or motivating story the outcome of which is easy to evaluate. These tests are usually different from test cases in that test cases are single steps whereas scenarios cover a number of steps.

The testing is executed by the employees of the project partners themselves. After each development iteration a working, integrated system is delivered to the testers. The testers install the service on the test devices and use the prepared scenarios to test where the service fulfils the requirements planned for this iteration.

The result of each testing iteration is documented on the one hand as an update to the requirement status and on the other hand as reported defects that allow the developers to fix the issues found.

#### 3.2 Field trials

The consortium decided to plan two different levels of field trials:

1. Field Trials in two countries (Switzerland and another one) for two weeks with ideally 10 caregivers in each country to test the features of the platform in March 2019
2. Field trials in four countries with ideally ten pairs of caregivers and people who wish assistance in each country to test the features of the platform as well as its interaction with the tag suite in September/October 2019. Time span: 6 weeks.. Due to the fact, that during the trials probably no real wandering event will occur, the consortium has serious concerns regarding the involvement of people with dementia. Furthermore, the benefit for participation of PwD in this kind of trials is called into question because of the sensitivity of the disease and the possibility to upset PwD and negatively affect their journey through the disease. For this reason, it seems to be reasonable to test the product with healthy people who wish assistance and take the role of PwD. Therefore, two different options for the second set of trials are in place which should be discussed with experts from the field.

##### 3.2.1 Usability Testing

Usability testing is a technique used in user-centered interaction design to evaluate a product by testing it on users. This can be seen as an irreplaceable usability practice, since it gives direct input on how real users use the system. This is in contrast with usability inspection methods where experts use different methods to evaluate a user interface without involving users.

Usability testing focuses on measuring a human-made product's capacity to meet its intended purpose. Usability testing measures the usability, or ease of use, of a specific object or set of objects, whereas general human-computer interaction studies attempt to formulate universal principles.

The results of usability testing are documented in a usability testing report. The main content of this report are findings (sometimes with suggestions for improvements) compiled from the end user feedback about where in the service usability barriers and problems are found.

These findings are then used by our usability experts to suggest changes and improvements for the service that our development partners can implement in the next development iteration.

### 3.3 Test Scenarios for Software Testing and the Field Trials

Key	Epic Link	Title	Summary	Issue Type	Description	Status
CL-1.1	Register	IC Register with email	Informal Carer registers their profile with an email address	Use Story Map	<p>As an Informal carer I want to be able to register myself with the Carelink system using my email address</p> <p><u>Pre-Condition(s)</u>: The Register screen has been selected, and the registration screen, with input fields is presented to me.</p> <p><u>Post-Condition(s)</u>: I have successfully populated the relevant fields, saved my details which are stored to a database.</p>	Test Required
CL1.2	Register	PwD Register with email	PwD registers their profile with an email address	Use Story Map	<p>As a PwD I want to be able to register myself with the Carelink system using my email address</p> <p><u>Pre-Condition(s)</u>: The Register screen has been selected, and the registration screen, with input fields is presented to me.</p> <p><u>Post-Condition(s)</u>: I have successfully populated the relevant fields, saved my details which are stored to a database.</p>	Test Required

CL1.3	Register	FC Register with email	Formal Carer registers their profile with an email address	Use Story Map	<p>As a Formal carer I want to be able to register myself with the Carelink system using my email address</p> <p><u>Pre-Condition(s)</u>: The Register screen has been selected, and the registration screen, with input fields is presented to me.</p> <p><u>Post-Condition(s)</u>: I have successfully populated the relevant fields, saved my details which are stored to a database.</p>	Test Required
CL2.1	Customise Profile	Basic Profile	User can update their Basic Profile	Use Story Map	<p>As a registered user I would like to customise my profile data, such as name, age, address.</p> <p><u>Pre-Condition(s)</u>: I am already a registered of the system, and I have successfully logged on and selected the update user profile screen, which is presented to me along with all the input fields.</p> <p><u>Post-Condition(s)</u>: My profile details have been entered and successfully stored to the Carelink user database</p>	Test Required
CL2.2	Customise Profile	PwD Information	User can add information pertaining to their PwD	Use Story Map	<p>As a registered user I want to be able to add and configure the details of a PwD that I am concerned with , including linking this PwD with my profile so that I receive alerts</p>	Test Required

					<p><u>Pre-Condition(s)</u>: I am already a registered user and I have added a PwD that I am interested in. I have selected the update screen pertaining to my PwD and am presented with the input fields</p> <p><u>Post-Condition(s)</u>: My PwD details are successfully stored to the database.</p>	
CL2.3	Customise Profile	Geo Locations	Update Geo Location boundaries for my PwD	Use Story Map	<p>As a registered user I want to be able to set up and ring fence certain geographical locations or zones and mark them as unsafe for the PwD that I am concerned about</p> <p><u>Pre-Condition(s)</u>: I am a registered user with a PwD that I am interested in. I have selected the zonal marking screen and am presented with a map to mark my unsafe zone(s)</p> <p><u>Post-Condition(s)</u>: I have successfully marked the unsafe zones on a map and this information is stored to the database relating to my PwD.</p>	Test Required
CL2.4	Customise Profile	Alert Options	Specify the Alert preferences that I can to be contacted on	Use Story Map	<p>As a registered user I want to be able to specify and configure the various methods that I can be alerted through</p>	Test Required

					<p><u>Pre-Condition(s)</u>: I am a registered user with a PwD that I am interested in. I have selected the alert screen that presents me with inputs to specify my contact preferences and details.</p> <p><u>Post-Condition(s)</u>: I have added my contact preferences and details and these have successfully been added to the database under my profile.</p>	
CL3.1	View Info on Dementia	Course Material	Gain access to course material from the Carelink platform	Use Story Map	<p>As a Carelink user I want to be able to access course material in order to educate myself on dementia and wandering.</p> <p><u>Pre-Condition(s)</u>: I am a registered user and I have selected the Carelink courses page, and specified a course that I want to read up on.</p> <p><u>Post-Condition(s)</u>: I am presented with my chosen course and can read this through the Carelink course interface</p>	Test Required
CL3.2	View Info on Dementia	Reading Material	Gain access to general reading material pertaining to dementia	Use Story Map	<p>As an interested party I want to be able to access various reading materials about dementia and wandering</p> <p><u>Pre-Condition(s)</u>: I am a member of the public and have selected the Carelink reading materials page</p>	Test Required

					<u>Post-Condition(s)</u> : I am presented with a series of links to interesting reading material pertaining to Dementia and wandering	
CL3.3	View Info on Dementia	Local Contacts	See a list of local volunteers who are available to help look for a wandering PwD	Use Story Map	<p>As a Carelink User I want to be able to access a list of local contacts willing to help in the case of wandering events</p> <p><u>Pre-Condition(s)</u>: I am a registered user and I have selected the Carelink local contacts page</p> <p><u>Post-Condition(s)</u>: I am presented with a series of local contacts that have specified their interest in searching for wandering people and have made their contact data available to Carelink.</p>	Test Required
CL3.4	View Info on Dementia	Support Group Forum	Get information and access to the Carelink support group forum	Use Story Map	<p>As an interested party I want to be able to access and join the support forum pertaining to dementia</p> <p><u>Pre-Condition(s)</u>: I am a member of the public and have selected the Carelink Support Groups page</p> <p><u>Post-Condition(s)</u>: I am presented with a series of links to support groups relating to dementia and wandering .</p>	Test Required

CL5.1	Receive Alert	SMS with Link to Location	Receive a message containing wandering information, including link to location of PwD	Use Story Map	<p>As a user I want to be able to receive an alert that includes a location link when my PwD has a wandering event.</p> <p><u>Pre-Condition(s):</u> I am a registered user on the Carelink system with my contact details added. I also am linked to a PwD and have unsafe zonal areas marked against their profile, and this PwD has wandered into an unsafe zone.</p> <p><u>Post-Condition(s):</u> I have received a message indicating that my PwD has potentially wandered and as part of the contact there is a link to a map that shows their location</p>	Test Required
CL6.1	View PwD Location	View Current Location	View map of PwD location	Use Story Map	<p>As a user I want to be able to view a map location that shows where my PwD is located.</p> <p><u>Pre-Condition(s):</u> I am a registered user with Carelink and I have received a message from the system with a link to a map that has the location of my PwD</p> <p><u>Post-Condition(s):</u> I have selected the map link and I am shown a map on my screen with the location of my PwD highlighted.</p>	Test Required



CL6.2	View PwD Location	View Historical Route	View route PwD took that lead to, and as part of, the wandering event	Use Story Map	<p>As a user I want to be able to see the route my PwD took to get to their current position.</p> <p><u>Pre-Condition(s):</u> I am a registered user of Carelink with a PwD associated with my profile. I have received an alert to indicate my PwD has wandered and I am shown there location on a map. From here I have selected the link to show me the route my PwD has taken to bring them to his location.</p> <p><u>Post-Condition(s):</u> I am presented with a map detailing the route my PwD has taken to arrive where they are.</p>	Test Required
CL6.3	View PwD Location	View Predicted Routes	View possible route outcomes based on the server prediction models	Use Story Map	<p>As a user I want to be able to be informed of possible predicted routes that my PwD may take, along with % confidence predictor.</p> <p><u>Pre-Condition(s):</u> I am a registered user of Carelink with a PwD associated with my profile. I have received an alert to indicate my PwD has wandered and I am shown there location on a map. From here I have selected the link to show me the possible routes my PwD may take based on their current position and their historical data.</p>	Test Required

					<u>Post-Condition(s):</u> I am presented with a map detailing a number of routes that my PwD may take from their current position.	
CL6.4	View PwD Location	Confirm Wandering Event	Confirm/Deny that the proposed wandering event was an actual wandering event	Use Story Map	<p>As a user I want to be able to confirm or deny that the wandering event sent to me by the system was actually a wandering event or not</p> <p><u>Pre-Condition(s):</u> I am a registered user of Carelink with a PwD associated with my profile. I have received an alert to indicate my PwD has wandered and I am shown there location on a map. From here I have the option of selecting a 'Confirm/Deny Wandering Event' link.</p> <p><u>Post-Condition(s):</u> I have selected either the confirm or deny wandering event and my decision is successfully sent to a database.</p>	Test Required
CL6.5	View PwD Location	Escalate Event/Alert	Raise the report of wandering event to a community alert	Use Story Map	As a user I want to be able to view my PwD wandering event and raise the event to a community alert, thus engaging a larger search community	Test Required

					<p><u>Pre-Condition(s)</u>: I am a registered user of Carelink with a PwD associated with my profile. I have received an alert to indicate my PwD has wandered and I am shown there location on a map. From here I would like to open up the search to the interested community of searchers.</p> <p><u>Post-Condition(s)</u>: My request to open up the search to the community is saved to a database, and a message is sent to the community alert service.</p>	
CL7.1	Locate PwD	Get Directions	Receive directions from carer's current location to the PwD location	Use Story Map	<p>As a user I want to be able to receive map directions from my current location to the location of my PwD that has wandered</p> <p><u>Pre-Condition(s)</u>: I am a registered user of Carelink with a PwD associated with my profile. I have received an alert to indicate my PwD has wandered and I am shown there location on a map. From here I would like to open up a map showing directions from my current location to the location of my PwD</p> <p><u>Post-Condition(s)</u>: I am presented with a screen that shows directions from my current location to the location of my PwD as well as various options to arrive at the PwD location</p>	Test Required

CL8.1	Engage with PwD	Get Guidelines	Receive guidelines about engaging with a PwD that is wandering	Use Story Map	<p>As a user I want to be able to receive instructions on how to engage with a PwD so that I do not intimidate or frighten them</p> <p><u>Pre-Condition(s):</u> I am a registered user of Carelink with a PwD associated with my profile. I have received an alert to indicate my PwD has wandered and I am shown there location on a map. From here I would like to open up a document giving advice on approaching PwD in case I disturb them</p> <p><u>Post-Condition(s):</u> I am presented with a document that shows how to approach PwD in a wandering event</p>	Test Required
CL9.1	Close Loop	Close Event	Close the wandering alert as solved	Use Story Map	<p>As a user I want to be able to close off a wandering event, marking it as solved, or not a wandering event</p> <p><u>Pre-Condition(s):</u> I am a registered user of Carelink with a PwD associated with my profile. I have received an alert to indicate my PwD has wandered and I am shown there location on a map. I have either found my PwD, or else this is not a wandering event. I want to now close this event as either</p>	Test Required

					<p>solved or 'not wandering' and I select the screen to close off wandering events.</p> <p><u>Post-Condition(s):</u> I have specified that the wandering event is either solved or not a wandering event and my decision is successfully stored to the database.</p>	
CL9.2	Close Loop	Provide Feedback	Provide feedback on the system based on experience	Use Story Map	<p>As a user I want to be able to provide feedback on the use of the system, allowing the system owners to improve the user experience</p> <p><u>Pre-Condition(s):</u> I am a registered user of Carelink with a PwD associated with my profile. I have engaged with the system and now select the 'Provide feedback' link, and am presented with input fields to leave a response</p> <p><u>Post-Condition(s):</u> I have completed the 'Leave Feedback' form and my inputs are successfully stored to the database.</p>	Test Required

## 4 Hardware Testing

### 4.1 Methodology for energy consumption testing

At this stage of the project, the consumption tests of the different modules, that make up the device, are essential so that it is possible to have a better prediction of the consumption of the proposed operating modes, and to later analyze the results, in order to conclude that their validity.

The operation modes for each module of the device are: transmitting, receiving, stand-by, and off.

As such, the methodology to be used will have to assertively measure the energy values consumed by each of the system modules. Thus, the methodology that seems to be the most adequate to these requirements makes use of a Shunt Resistance placed in series between the battery and the device. An exemplary scheme can be found in **Error! Reference source not found..**

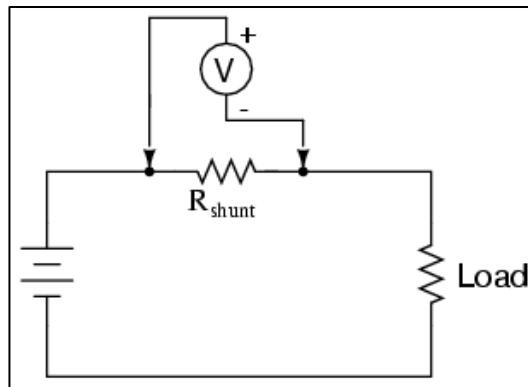


Figure 1: Current consumption measurement schematic

With this assembly it is possible to measure the difference in potential  $V_s$  at the terminals of the recurrent using a Voltmeter. In this way it is possible to calculate the current,  $I_s$ , passing through the resistor, using the following equation,  $I_s = V_s / R_s$ , which represents the current being delivered to the device.

To reduce the uncertainty of these measurements the shunt resistance value should be reduced, in the order of  $1\Omega$ .

Having measured these current values delivered to the device for each mode of operation, it is possible to estimate the life of the battery until it is fully discharged.

## 5 CONCLUSIONS

---

In this document we have described the test scenarios as required by the Carelink project to ensure that the service is in fully working condition before being given to end users. The scenarios are based on the user requirements gathered early on in the project and will be updated as the project progresses. An updated version of these scenarios will be delivered in July 2019, after the project has validated the concept and processes with real end-users.