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CARU's voice-controlled notification, communication and documentation features:

Concept for the field trial in Austria and Switzerland

Trail- & validation requirements

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Reviewed by	Cornelia Schneider (FHWN)

List of Authors

Birgit Trukeschitz (WUWI)

Daniel Kammer (WUWI)

Friedrich Ebner (WUWI)

Nadine Sturm (JOHA)

Emanuel Gfeller (BONA)

Ulrike Schneider (WUWI)

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1 Introduction

The CARUcares field trial aims to test CARUcares' new documentation, communication as well as its notification feature in real-life settings in Austria (domiciliary care) and Switzerland (smart living facilities). All three new features were developed for the voice-assistant CARU to facilitate the exchange of information between service users and professional (care) providers in home care and assisted living environments.

In the field trial, we are interested in assessing the technical functionality of the three features in people's homes, the service users' and care workers' perceptions and general experience with CARU as well as core aspects of user experience of CARU's new features. For this purpose, according to the project proposal, 50 service users and 16 care workers/concierges in Switzerland and Austria will take part in the three months field trial. Compared to the proposal, the start of the field trial will be postponed by three months due to national restrictions related to the COVID-19 pandemic. The technical developers thus got more time to improve the new features. The field trial is planned to commence in April 2021 and will last for three months (until June/July 2021).

This paper aims to provide the concept for the three-month field trial and the evaluation of the three newly developed features. It guides the set-up, data collection and data analysis of the trial.

This paper is structured as follows: Section 2 gives a brief overview of the new CARUcares features. Section 3 details the aims of the field trial for each of the new features. Section 4 describes the roll-out and implementation process of the field trial. Section 5 gives insights into the methods and measures of the field trial before we describe the time plan of the field trial in section 6.

2 Description of new CARUcares features for the field trial

2.1 CARU's extended communication feature

The extended communication feature (hereafter referred to as 'communication feature') offers voice communication scenarios for "casual" communication between the service user and the service providers' call center. The feature is activated by the service user using voice only. By calling "Hallo CARU – Zentrale" ("Hello CARU – service centre"), CARU will call the service hotline and establish a connection towards an employee at the service line. While calling the service hotline, CARU will flash a white light. A voice message functionality allows

the end-users to leave messages in case a call cannot be taken immediately by service hotline employees.

2.2 CARU's documentation feature

Through a voice-command, the care worker can activate a documentation functionality of CARU. By calling "Hallo CARU – Aufgabenliste" ("Hello CARU – to-do list") CARU will activate the to-do list, inform the care worker about tasks to be done, and ask the care worker which task he or she has completed. Via dedicated documentation commands, referring to the documentation standard the organization applies, the care worker is able to document his or her care activities via voice. CARU acknowledges each activity in a spoken form. If, for example, the care worker confirms having washed a service user's hair, s/he says „Haare waschen" ("wash hair"). CARU confirms the input by announcing "Ich habe "Haare waschen" erkannt, "Haare waschen" wird als erledigt markiert." ('I have received/understood 'wash hair', 'wash hair' will be marked as done').

Instead of mentioning an activity from the list (in order to remove it from the list), the keywords "Übergabe" ("hand-over") or "Sprachnachricht" ("voice-message") can be used to enable the option to record a voice-message via CARU. The recorded message is sent to a pre-defined e-mail address afterwards.

The voice recording for "Übergabe" ("hand-over") is the only recording executed by the documentation feature. For the field trial, data on the activities will be entered manually in Austria and in Switzerland. Data on when a CARU device retrieved a to-do list (timestamp) is stored in text files along with information about what items of the list have been marked as "done." Such a text file contains furthermore a pseudonymised CARU device ID and is stored on a non-public network storage server. On there, separate files are created for each partner.

2.3 CARU's notification feature

For this functionality, CARU has access to the crew-planning schedule of the care organization in Austria and the attendance timetable of concierges at each facility in Switzerland. In Austria, the GPS data of the care worker (GPS-tracker) will be used to improve the prediction of the arrival time.

The CARUcares notification feature aims to predict the time of arrival of the care worker (Austria) or concierge (Switzerland). The full scope of the notification functionality will be tested with end-users in Austria only. Testing the full scope of this feature means that the prediction of arrival time does not only use crew scheduling plans but also data generated by GPS trackers used by care workers when on tour. This should result into a more precise

prediction of the time of arrival at the care service users’ households. In Switzerland, however, the setting is different. There, CARU informs test persons of the concierges’ weekly scheduled attendance time at their location. Concierges will not take GPS trackers with them. In the Swiss settings, CARU only announces the attendance time scheduled.

By calling “Hallo CARU – Ankunft” (“Hello CARU – Arrival”), CARU will retrieve the deposited time of arrival (in Switzerland) and the estimated arrival time of the care worker (in Austria) and tell the care service user via voice output the timeslot of the arrival of his or her care worker (Austria) or concierge (Switzerland). According to the requirements analysis, in Austria timeslots spaced between 60min intervals (e.g. between 9.45 and 10.45) are provided in order to avoid additional pressure on the care workers.

Table 1 gives an overview of the target group for each new feature.

Table 1: Presumed relevance of the new CARUcares features for each target groups

	Communication feature	Documentation feature	Notification feature
Service users	X	(X)	X
Care workers/concierges		X	(X)
Service hotline staff	X		X
Care managers	(X)	X	(X)

Notes: X = direct benefit from the feature; (X) = indirect benefit from the feature.

3 Aims of the evaluation of the CARUcares field trial

The field trial aims to (i) test CARUcares’ new documentation, communication and notification feature in real-life situations and to (ii) collect information on the views and perceptions of older people, care workers/concierges and service hotline staff.

For that purpose, a collaborative process was started in December 2020. Almost all partner organizations (BONA, CARU, FHWN, JOHA, SCWI and WUWI) contributed to the brainstorming process on the aims of the field trial by early January 2021. Feedback was collected on the aims and expected learnings for all three newly developed features to be tested in field trial. SLGR commented only on the response time of CARU and on the arrival feature mid of February 2021. Partners’ contributions were analyzed by WU. The results can be found in the following subsections.

The aims of the field trial can be clustered in five groups. General aims of the field trial can be found in subsection 3.1, aims for the CARUcares’ communication feature in 3.2, aims for the

CARUcares' documentation feature in 3.3, aims for the CARUcares' notification feature in 3.4, and finally, aims of the evaluation and roll-out process in subsection 3.5.

Please note that these aims represent a **maximum** of possible aspects to collect data on. WU may select topics when preparing the surveys and interview guidelines to keep data collection feasible for all participants.

3.1 General aims for the evaluation of the field trial

All new features aim to facilitate the exchange of information between professional (care) providers and private end-users. A general aim of the field trial is to test the technical functionality of the prototype, i.e. whether the new features work in practice. According to the proposal, the following key performance indicators have been identified:

Key performance indicators listed in the proposal:

- Subjective intention to use – end-user (>75%)
- User satisfaction end-user (>75%)
- Subjective intention to use – care worker (>75%)
- User satisfaction care worker (>75%)

Furthermore, the field trial aims to collect data on the qualitative perception of participants regarding the new features. It will be investigated how happy customers are with the new feature, what they like most and what real benefit they perceive through the new features in their daily-life. Seven key indicators have been determined for the field trial I in the brainstorming with partner organizations:

- **Technical functionality**
 - Work in practice: Does the communication feature work in practice?
 - Stable work: Was the device stable in its performance? Is it reliable?
 - Do users know how to activate CARU and the three new features?
 - Can users activate the three new features?
 - Do users understand the meaning of CARU's lights?
 - Is it clear for users whether CARU has understood the commands or not?
- **Usage behavior**
- **Usage**
- **Aspects of user experience**
 - Experience:
How do end-user experience:
 - Using a voice assistant?
 - The features flow in general?

- Commanding and interacting with the device?
 - Speed, timing and volume?
 - The device itself?
- Joy / ease of use
- Qualitative perception
- Appreciation: Do the trial participants like to have CARU in their home?
- **User satisfaction (KPI)**
 - Customer Happiness:
 - How happy are customers with the new features?
 - What do they like most?
- **Perceived value**
 - Customer benefit: Do clients have a real benefit from the communication and notification feature?
 - If yes, which are the benefits for them?
 - Usefulness: Are the features useful for care workers/home helps/clients?
 - Voice assistance in general: How would they generally rate the potential for voice assistance supporting their life/work?
- **Room for improvement**
 - Characteristics to be changed in order to integrate the feature in their daily-life (end-user) / working routine (care worker) (KPI)

3.2 Aims of the evaluation of CARU's communication feature

The communication feature will be tested with end-users and service hotline staff in Austria and Switzerland to get feedback on the functionality of the new feature and the end users' first impressions of the communication feature.

According to the proposal, the following key performance indicators have been identified:

Key performance indicators listed in the proposal:

- Voice connection reliability – end user (in %)
- Quality of connection – end user (in %)
- Initiated interactions – end user (1...x)
- Voice connection reliability – service hotline staff (in %)
- Quality of connection – service hotline staff (in %)
- Initiated interactions – service hotline staff (1...x)

Furthermore, according to the brainstorming with partner organizations we will gain insights in the qualitative perception of end-users and the service hotline staff about the new feature.

3.2.1 Expected learnings from service users

- **Technical functionality (KPI)**
 - Work in practice:
 - Did it work as it should?
 - Can end-users trigger the communication feature?
- **Usage**
 - Frequency log files: How often did clients use it?
- **Usage behavior**
 - Time / Reason of contact: When do they prefer to contact the service center (office hours, off hours, time, etc.) and for which reasons?
 - Most frequent questions: Which are the most frequent questions to the service center?
 - Replacement of calls:
 - Did it replace phone calls or did people forget about using the feature?
 - Do they prefer CARU instead of a normal phone? Why the one or the other?
- **Aspects of user experience**
 - Feature flow: How was the feature flow? Did it work, as it should?
 - Waiting time evaluation: How do end-users perceive the period of waiting for CARU's response?
 - Appreciation: Voice activation appreciated for calling service hotline?
- **Perceived value**
 - Customer benefit: Was there a clear benefit of using it and if yes, which one?
 - Simplified contact: Can CARU facilitate the contact with the service hotline for the customers?
- **Room for improvement**
 - General improvement:
 - Is it suitable?
 - What could be improved?

3.2.2 Expected learnings from service hotline staff

- **Perceived Value**
 - Office worker benefit: Could the voice messages be processed? Easier or more difficult than receiving phone calls? Time saving or not?
 - How does the additional channel affect every day work?
- **Room for improvement**
 - General improvement:

- Did they have any troubles?
- Was there a difference to regular phone calls, if yes which one?

3.3 Aims of the evaluation of CARU's documentation feature

To get feedback from users on the new documentation function, the feature will be tested together with care workers in Austria and Switzerland. According to the proposal, the following key performance indicators have been identified:

Key performance indicators listed in the proposal:

- Frequency of use (1...x)
- Number of entries (1...x)
- Correct entries of completed tasks (in %)
- User satisfaction
- Time savings (1...x)
- Increased transparency for end-users (in %)

Furthermore, according to the brainstorming with partner organizations we will gain insights into the qualitative perception of care workers about the new documentation feature on:

- **Technical functionality**
 - Work in practice:
 - Did it work as it should?
 - Can care workers trigger the documentation feature?
 - Stable work: Did the care workers feel that the device is reliable?
- **Usage**
 - Frequency (log-files):
 - How often did care workers use the documentation feature? (KPI)
 - Did care workers use handover messages – how often? (KPI)
- **Usage behavior**
 - Conversation triggered:
 - Did the to-do list of CARU trigger a conversation between caregiver and client?
 - How did it influence the conversation?
- **Aspects of user experience**
 - Experience:
 - Is the actual implementation of the feature suitable for the concierges/caregivers?
 - Is the feature well applicable in the work life?

- How did they experience using it when clients could hear the tasks?
 - Which experiences have they had?
 - Do the caregivers see an additional value in the use for clients?
- Waiting time evaluation: How do end-users perceive the period of waiting for CARU's response?
- Feature flow: How was the feature flow? Did it work as it should?
- Appreciation: Do the clients appreciate to hear the task list of the caregiver?
- **Perceived value**
 - Care worker benefit:
 - Do concierges/ caregivers like to use CARU for documentation?
 - Was there a clear benefit of using it and if yes, which one?
 - Time efficiency: Is the feature time-efficient?
 - Suitability for Austria only: Do care workers think that a voice-supported documentation feature could save time if connected to the real care management system?
- **Room for improvement**
 - Activities recorded:
 - Would they like to record other activities or information?
 - Are the suggested activities in the list the most used ones?
 - How were comments on the activities handled?
 - Tasks have only been partly completed: how to report on this?
 -

3.4 Aims of the evaluation of CARU's notification feature

According to the proposal, the following key performance indicators have been identified:

- Stress reduction – care worker (in %)
- Time efficiency – care worker (in %)
- Stress reduction – end user (in %)
- Degree of confidence – end user (in %)

A further aim of the field trial evaluation relates to the precise assessment of the estimates for expected and actual time of arrival of the care workers (which will be conducted by FHWN). In addition, following the brainstorming with partner organizations we will gain insights into the qualitative perception of end-users and service hotline employees about the new feature.

3.4.1 Expected learnings from end-users

- **Technical functionality**
 - Work in practice:
 - Did it work as it should?
 - Can end-users trigger the notification feature?
 - Correct arrival times: Have the arrival times been predicted correctly?
- **Usage**
 - Frequency (log-files): How often did clients use it?
- **Usage behavior**
 - Replacement of calls:
 - Did it replace phone calls or did people forget about using the feature?
 - Do clients prefer to ask CARU or the service hotline for the next care worker appointment?
- **Aspects of user experience**
 - Feature flow: How was the feature flow?
 - Interaction: Are they able to understand CARU?
 - Appreciation: Is the actual implementation of the feature suitable for them?
 - Waiting time evaluation: How do end-users perceive the waiting period for CARU's response?
 - Time interval: How do they perceive the time-interval of the notification?
- **Perceived value**
 - Customer benefit: Could CARU help them to remember the presence times?
 - Was there a clear benefit of using it and if yes, which one?
 - Does it release stress to be able to check, when caregiver is coming? (KPI)
 - Usefulness:
 - Do clients want to know when the concierge is at their location?
 - What does it mean to them to know when the concierge is at their location?
 - Is CARU useful for them by telling them when the concierge is there?
 - Would they like to know if the concierge is delayed?
- **Room for improvement**
 - General improvement: What should be improved?

1.1.1 Expected learnings from service hotline staff

- **Usage behavior**
 - Did the number of calls to get information on the arrival time of the care workers decrease?

1.1.2 Expected learnings from care workers

- **Perceived value**
 - Stress reduction (KPI)

3.5 Aims of the evaluation of the roll-out phase

- Did the **manual** help for:
 - finding the right place for CARU
 - finding quick help for using the features (find the right keywords)
 - Getting proper support.

Table 2 summarizes the aims for the CARUcares field trial by feature.

Table 2: Aims of the CARUcares field trial

	General	Communication Feature	Documentation Feature	Notification Feature
Technical Functionality (1)				
Work in practice (KPI)	X	X	X	X
Stable work	X	X	X	X
Correct arrival times ⁺				X
Usage⁺ (2)				
Frequency (log-files) (KPI) ⁺	X	X	X	X
Usage Behavior⁺ (3)				
Time of contact ⁺		X		
Reason for contact ⁺		X		
Most recent questions ⁺		X		
Replacement of calls ⁺		X		X
Conversation triggered			X	
Aspects of UX (4)				
Experience	X		X	
Feature flow	X	X	X	X
Interaction	X			X
Joy & ease of use	X			
Qualitative perception	X			
Appreciation		X	X	X
Waiting time evaluation				X
Time interval				X
User Satisfaction (5)				
Customer Happiness (KPI)	X	X	X	X
Perceived Value (6)				

Customer benefit (E-U) (KPI)	X	X		X
Usefulness (E-U)	X		X	X
Assistance (E-U)	X			
Simplified contact (E-U)		X		
Office Worker benefit (OW)		X		
Care Worker benefit (CW) (KPI)			X	(X)
Time efficiency (CW)			X	
Suitability (CW)			X	
Room for Improvement (7)				
General improvement (KPI)	X	X		X
Messages during day (E-U)		X		
Messages back (OW)		X		
Activities recorded correct?			X	
Manual (8)	X			

Note: + data / results provided by technical or end-user partners.

E-U = End-user; OW = Office Worker; CW = Care worker.

4 Recruitment of participants for the CARUcares field trial

4.1 Target groups

According to the proposal, three target groups have been identified for the field trial: (I) older persons living in assisted living environments (end-users), (II) care workers and (III) service hotline staff from end-user organizations in Austria and Switzerland.

4.2 Number of participants

In order to optimize recruiting, a strategy will be discussed with both end-user organizations (BONA, JOHA). According to the proposal, it is planned to recruit:

- 2x25 older service users in Switzerland and Austria
 - 25 home care service users in AT
 - 25 smart living residents in CH
 - = Total of 50 service users
- 2x8 care workers in Switzerland and Austria
 - 8 care workers in AT
 - 4-5 concierges, service hotline staff, (manager) in CH
 - = Total of 16 care workers/concierges

- In addition to the proposal, we will involve 2 service hotline workers in Austria and Switzerland

4.3 Inclusion and exclusion criteria

4.3.1 Service user characteristics

- Need for and interest in using the features to be tested (most important!)
 - Need to know or interested in knowing the arrival time of care workers
 - Calling the service center staff frequently
- Strong mobile data connection in the participants' homes (to be checked when installing CARU – see 4.3 Installation).
- Able to give feedback
- Able to use high-level language – accent training of CARU is not possible within this project as we rely on the services provided by an external service
- No difficulties in pronouncing words
- Able to speak up
- Able to use the device with the voice recognition as it is

4.3.2 Care worker/Concierge characteristics

- Home care: home helpers, assistant nurses (Pflege(fach)assistenz), graduate nurses; smart living setting: concierges
- **interested in voice-supported care documentation, open-minded about voice-supported to-do lists (most important!)**
- Personal relationship, visits on a regular basis (for Austria at least twice a week; for Switzerland once a week)
- Able to give feedback
- Able to use high-level language – as accent training of CARU is not possible within this project as we rely on the services provided by an external service
- No difficulties in pronouncing words
- Able to speak up
- Able and willing to use the device with the voice recognition as it is

4.3.3 Service hotline staff characteristics:

Service hotline staff should have (i) regular contact with clients (contact point), (ii) be familiar with and have access to care planning systems and (iii) have time resources for the documentation of the communication functionalities to be tested in the field trial.

4.4 Data collection during recruitment phase

We will collect data during the recruitment process to collect information on response and non-response. An excel-spreadsheet will be provided by WU.

Data on recruited participants comprise

- **for Austria:** Client ID, first name, family name, telephone number, year of birth, gender, LTC allowance level (Austria), living alone (y/n), district (Austria: Innsbruck City/ Innsbruck surrounding); number of service provision per week, occupational group (care worker, home help, nurse), reasons for participation, care workers participating in the project
- **for Switzerland:** year of birth, gender, living alone (y/n), location of smart home facility and name of the corresponding responsible concierge, reason(s) for participating in the field trial.

The data on the trial participants should point out the individual connection between care-worker/concierge and trial participant (e.g. which care worker is responsible for which client).

In order to learn who is interested in participating in such a trial and who is not, information (on gender, year of birth, and LTC allowance (in Austria only), and reasons for not taking part in the field trial) are required for people who refused to take part in the trial. This information will be collected by both end-user organizations and will be shared with WUWI.

5 Implementation of the CARUcares field trial

5.1 Materials for recruitment and roll-out

5.1.1 Materials for recruitment

- Information sheet on CARU's three newly developed features and the trial (Figure 1)
- Informed consent forms (including information on the trial phase)

Figure 1 : Information sheets for Johanniter and bonacasa





caru cares

Mitreden für eine gute Zukunft

CARU bietet praktische Funktionen für Ihre Pflege oder Betreuung

CARU ist ein Sprachassistent, der Sie in der Kommunikation mit Pflegediensten unterstützt. Das Gerät steht bei Ihnen im Wohnbereich und kann mit einfachen Sprachbefehlen gesteuert werden. Das Suchen von Telefonnummern und die oft komplizierte Bedienung des Handys fallen weg.




 Abfrage des nächsten
Pflegetermins


 Anruf bei der Johanniter
Pflegeabteilung


 Aufgabenmanagement
für das Personal

Wir suchen TeilnehmerInnen für die Testphase, in der wir diese 3 neuen Funktionen ausprobieren. Der sogenannte Feldtest dauert 3 Monate, Sie bekommen kostenlos ein Gerät nach Hause und berichten uns, wie Sie damit zurecht kommen.

Haben Sie Fragen? Die Johanniter, Abteilung Forschung stehen Ihnen Mo – Fr von 9 – 15 Uhr zur Verfügung.
Nadine Sturm, 0676 83112 816
Gabriele Salomon, 0676 83112 817
www.carucares.com


www.johanniter.at

Mitreden für eine gute Zukunft
caru cares

ja, ich will teilnehmen

caru cares

Mitreden für eine gute Zukunft

CARU bietet praktische Funktionen für die Unterstützung im Alltag

CARU ist ein Sprachassistent, der Sie in der Kommunikation mit der Servicezentrale unterstützt. Das Gerät steht bei Ihnen im Wohnbereich und kann mit einfachen Sprachbefehlen gesteuert werden. Das Suchen von Telefonnummern und die oft komplizierte Bedienung des Handys fallen weg.




 Abfrage des nächsten
Conciergebesuchs


 Anruf bei der bonacasa
Servicezentrale


 Aufgabenmanagement
für die Concierge

Wir suchen TeilnehmerInnen für die Testphase, in der wir diese 3 neuen Funktionen ausprobieren. Der sogenannte Feldtest dauert 3 Monate, sie bekommen kostenlos ein Gerät nach Hause und berichten uns, wie Sie damit zurecht kommen.

ja, ich will teilnehmen

Haben Sie Fragen? Die Servicezentrale von bonacasa steht Ihnen an Werktagen von 7:30 bis 17:30 Uhr zur Verfügung.
Projektleiter bei bonacasa:
Emanuel Gfeller, 032 625 95 92

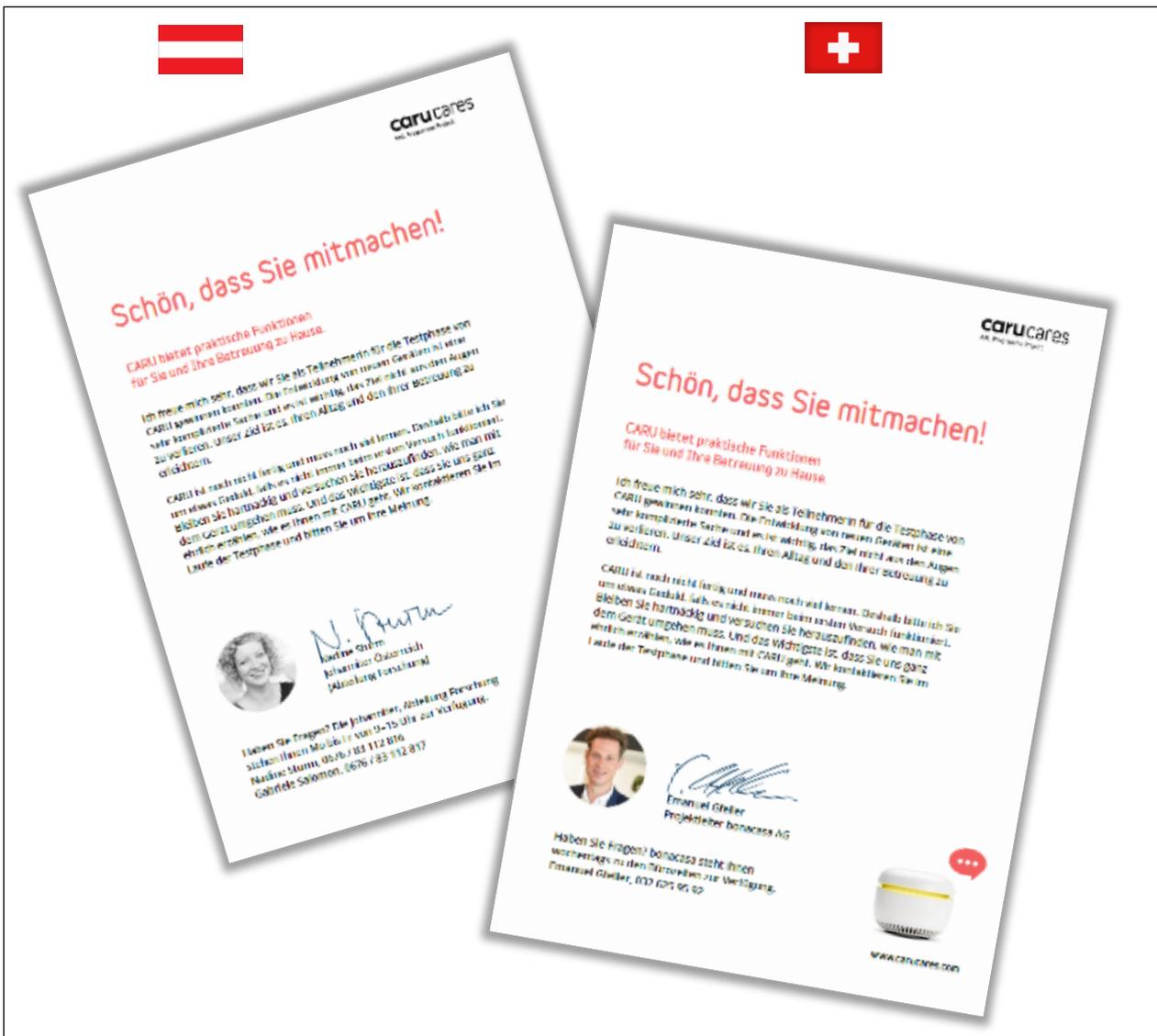

www.bonacasa.ch

Source: Design by Schneeweis Wittmann ≈ Design Digital Analog, 2021

5.1.2 Materials for roll-out

- Letter to the participants for each country (Figure 2), welcoming the trial participants. The letters will be signed by the end-user organisations (Johanniter and bonacasa)
- Videos for care workers
- Manuals for trial participants (service users and care workers) (Figure 3)
- Manual on how to use the GPS tracker (Austria) (Figure 4)

Figure 2: Letters to the participants of Johanniter (Austria) and bonacasa (Switzerland)



Source: Design by Schneeweis Wittmann ≈ Design Digital Analog, 2021

Figure 3: Manual for service users & care workers –example for Austria (in German)

Problembhebung

CARU versteht „Hallo CARU“ nicht?
Warten Sie mindestens 5 Minuten ab und versuchen Sie es erneut. Falls das Problem weiter besteht, starten Sie CARU neu (siehe unten).

CARU führt keine Funktionen aus?
CARU versteht „Hallo CARU“ (leuchtet kurz weiß auf) aber reagiert nicht auf die Schlüsselwörter? Möglicherweise ist die Internetverbindung nicht ausreichend. Platzieren Sie CARU um und folgen Sie dem Kapitel *Installation* in dieser Anleitung.

CARU antwortet auf Englisch?
Englische Ausdrücke sind Fehlermeldungen. Warten Sie mindestens 5 Minuten ab und versuchen Sie es erneut.

CARU ist zu leise oder zu laut?
Die CARU Lautstärke kann vom CARU Support verändert werden. Bitte nehmen Sie mit dem CARU Support Kontakt auf.

CARU neu starten
Ziehen Sie das Stromkabel heraus und drücken Sie den kleinen Knopf an der Unterseite des Geräts. Nach dem Erklängen eines Signals folgen Sie der Anleitung *Einschalten* in dieser Anleitung.

Schlüsselworte für die Johanniter

„Hallo CARU, Aufgabenliste.“
Dokumentation der Tätigkeiten

„Hallo CARU, Übergabe.“
Übergabe-Nachricht für KollegInnen

Meine Schlüsselworte

„Hallo CARU, Anknüpf.“
Abfrage des nächsten Betreuungstermins

„Hallo CARU, Zentrale.“
Anruf bei der Johanniter Pflegeabteilung



caru cares

„Hallo CARU“

Bedienungsanleitung

www.carucares.com

Meine Funktionen

Ich möchte wissen, wann die Johanniter kommen
Sagen Sie **laut und deutlich** „Hallo CARU, Anknüpf.“ CARU berechnet Ihren nächsten Betreuungstermin. Nachdem CARU Ihnen diesen Termin mitgeteilt hat, schaltet sich CARU automatisch wieder ab.

Ich möchte die Johanniter Pflegeabteilung anrufen
Sagen Sie **laut und deutlich** „Hallo CARU, Zentrale.“ CARU startet einen Anruf. Innerhalb der Geschäftszeiten werden Sie direkt mit der Zentrale verbunden. Außerhalb der Geschäftszeiten können Sie eine Sprachnachricht hinterlassen. Stoppen Sie die Aufnahme, indem Sie CARU für einige Sekunden an der Oberseite berühren.

CARU stoppen
Sie können jede Funktion stoppen, indem Sie CARU für einige Sekunden an der Oberseite berühren.

Funktionen für die Johanniter

Abwurf der Aufgabenliste
Sagen Sie **laut und deutlich** „Hallo CARU, Aufgabenliste.“ CARU startet die Abfrage, liest die Liste der zu erledigenden Aufgaben vor und endet mit der Frage, welche Aufgaben erledigt wurden.

- Aufgabe als erledigt markieren: Sagen Sie **eine Aufgabe, die Sie erledigt haben**
- Ihre Eingabe korrigieren: Befehl **„Korrektur“**
- Übergabe-Nachricht aufnehmen: Befehl **„Übergabe“**
- Funktion stoppen: Befehl **„Stopp“** oder CARU für einige Sekunden an der Oberseite berühren.

Aufnehmen einer Übergabe-Nachricht
Sagen Sie **laut und deutlich** „Hallo CARU, Übergabe.“ CARU startet die Aufnahme und Sie können zu sprechen beginnen. Beenden Sie die Nachricht, indem Sie für einige Sekunden zu sprechen aufhören oder CARU für einige Sekunden an der Oberseite berühren.

Installation

Standort wählen
Idealerweise befindet sich CARU in dem Raum, in dem Sie sich am häufigsten aufhalten. **Platzieren Sie CARU an einem gut zugänglichen Ort** z. B. auf einem Tisch oder einer Anrichte. Bitte stellen Sie CARU nicht zu nah an ein Fenster, Fernseher oder Radio. Eine Steckdose sollte in der Nähe sein.

Einschalten
Schließen Sie CARU mit dem mitgelieferten Stromkabel am Stromnetz an. **Warten Sie ca. 5 Minuten ab**, bis CARU nicht mehr weiß pulsend aufleuchtet.

Machen Sie einen Test. Sagen Sie: „Hallo CARU“. Falls CARU dann NICHT kurz konstant weiß aufblinkt, warten Sie einige Minuten und versuchen es erneut, bis CARU reagiert.

Funktionstest
Sagen Sie **laut und deutlich** „Hallo CARU, Anknüpf.“ in Richtung des Geräts. CARU leuchtet weiß auf. Bei ausreichender Internetverbindung reagiert CARU nach wenigen Sekunden mit einem kreisenden Lichtsignal. CARU startet die Abfrage, antwortet und schaltet sich automatisch wieder ab.

Wiederholen Sie diesen Test 6 Mal. Können Sie in 5 von 6 Versuchen die Funktion aktivieren? Dann haben Sie den optimalen Platz für CARU gefunden. Wenn nicht, lesen Sie bitte das Kapitel *Problembhebung* in dieser Anleitung.

CARU Support
Haben Sie Fragen? Die Johanniter, Abteilung Forschung stehen Ihnen Mo bis Fr von 9-15 Uhr zur Verfügung.
Nadine Sturm, 0676 / 83 112 816
Gabriela Salomon, 0676 / 83 112 817

Möchten Sie eine Gerätestörung melden? Bitte lassen Sie CARU eingesteckt und kontaktieren Sie unseren technischen Support unter +43 44 819 19 72 oder support@caruhome.com

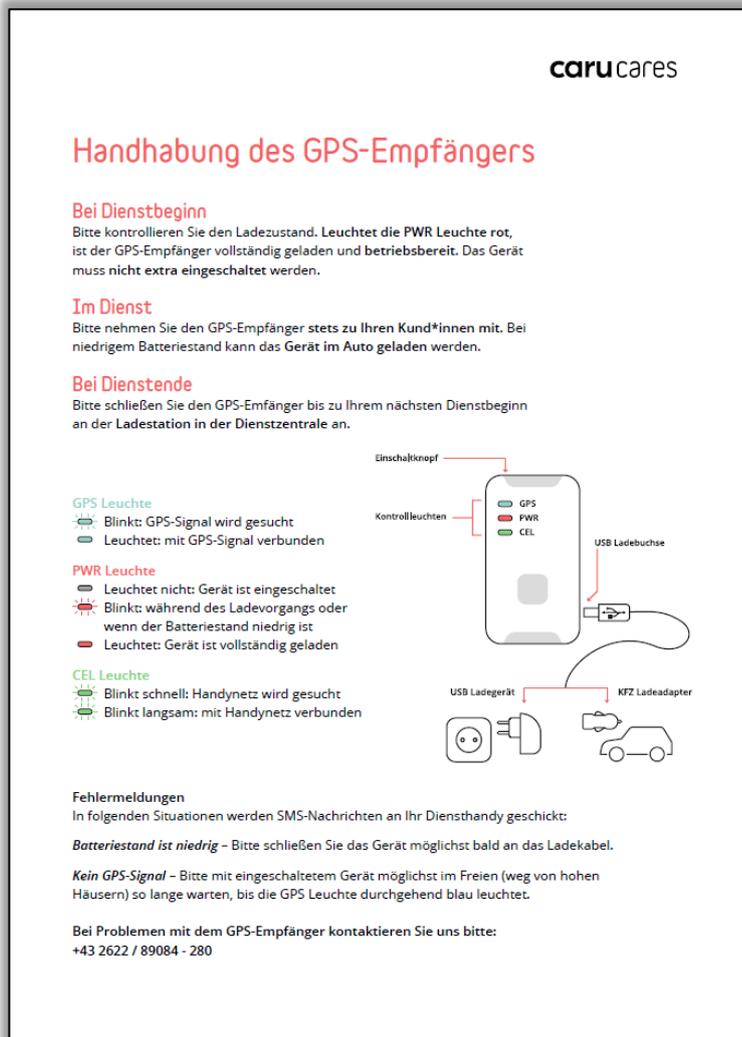
www.carucares.com

Source: Design by Schneeweis Wittmann ≈ Design Digital Analog, 2021

16

DEL 2.3 – part 2: Field trial – Trial- & Validation requirements – final version

Figure 4: Manual on how to use the GPS tracker (in German)



Source: Design by Schneeweis Wittmann ≈ Design Digital Analog, 2021

5.2 Roll-out plan for the CARUcares field trial

5.2.1 CARU package for field trial participants (care service users)

As the process of introducing CARU to the trial participants (onboarding) has been identified as essential (Trukeschitz/Kieninger et al. 2019), effort will be put into creating a package for roll-out that can be easily taken to the households and looks presentable.

The CARU device will be delivered in a brown bag with a “Hallo, CARU!”-sticker on it as shown in Figure 5. The bag also contains the welcome letter and the CARUcares manual for care service users and their care workers/concierges.

Figure 5: CARUcares package for field trial participants



Source: Photo provided by Schneeweis Wittmann ≈ Design Digital Analog, 2021

5.2.2 Roll-out plan for Austria

General strategy & timeline

In Austria, the CARU devices will be brought to the client’s home by the client’s care worker or home help. The setting for recruitment will require a combination of client and care worker/home help providing care to this client. The distribution of CARU devices as well as the placement and activation of the device will be done by the care worker (in AT this term comprises the following professions: registered nurses, certified nursing assistant, home care worker).

CARU devices, which arrive at the end-user partner JOHA must have the latest update to avoid further efforts for employees in Innsbruck.

In addition, in Austria, **GPS-trackers** will be handed over to all care workers before the start of the trial phase. Via SMS, the care workers will be reminded to charge and turn on the trackers and to take them with them before starting their shift. The care workers will receive

a guideline on how to handle the trackers. Those not testing all CARUcares features but just contributing to testing the notification feature will receive a separate informed consent.

Table 3: Timeline for preparing the field trial in Austria

Date	Action	Who
16 Feb 2021 (WU) 19 Feb 2021 (JOHA)	Go-NoGo Test , further actions if result is "Go" (otherwise rescheduling will be necessary)	JOHA: Nadine Sturm, Gabriele Salomon WU: Daniel Kammer, Friedrich Ebner, Birgit Trukeschitz
22 – 26 Feb 2021	Pre-defining clients and care workers to be recruited	JOHA: Nadine Sturm, Matteo Floiss, care workers
1-5 March 2021	Final check of materials required for recruitment: <ul style="list-style-type: none"> • info on CARU and its new features/manual (provided by SCWI) for clients and care workers • informed consents (IC) updated, provided by WU/JOHA • excel-sheet for collecting data on the participants and non-response, provided by WU 	JOHA: Nadine Sturm, Gabriele Salomon Input from SCWI, WU
8 March – 1 April 2021	Recruitment period (signed IC marks a successfully recruited person) of care workers and clients <i>Material required: Info sheet for clients, Info sheet for care workers, Informed consent for both target groups</i>	JOHA: Matteo Floiss, care workers, Nadine Sturm & Gabriele Salomon (support)
15 March 2021	CARU devices ready to use (including all updates) arrive at Innsbruck	CARU
	8 tablets sent to JOHA Innsbruck	WU
20 March - 1 April 2021	GPS trackers sent to JOHA Innsbruck	FHWN
15 March – 15 April 2021	Allocation of CARU device to a specific client, match client ID (from system, will be provided by ilogs after IC is signed) with device ID, distribute this match to technical partners.	JOHA: Nadine Sturm, Gabriele Salomon, Matteo Floiss
	Online/phone briefing and support for installation to care workers, support for roll out	JOHA: Nadine Sturm, Gabriele Salomon
1-15 April 2021	Distribution of CARU devices to clients' homes – test set up together with CARU support	JOHA: Matteo Floiss, care workers

	<i>Material required: instruction manual to install and use CARU device</i>	
5-15 April 2021	Distribution of GPS trackers	JOHA: Matteo Floiss
01 – 15 April 2021	Export to-do lists (manually or automatically – needs to be checked) of participating clients in xls files and distribute to HSLU for docu function (needs to be allocated by HSLU to specific device ID)	Nadine Sturm, Gabriele Salomon, Matteo Floiss
15 April 2021	Start of trial phase	all

Measures taken to abide by the COVID-19 restrictions in Austria

As the clients are visited regularly by the care worker/home help, there is no other contact necessary to install CARU at the clients’ homes.

Installation

The care workers select a place for CARU together with the service users in the service users’ homes according to CARU’s instruction manual. After plugging CARU in, both the care worker and the home care service user will run a functionality test as stated in the instruction manual. In case of poor functionality, the trial participants will be supported by the CARU support team who check for adequate data connection. The support team might give advice on finding a CARU placement with better connectivity. If the data connection using CARU’s SIM-card is poor at all possible locations in a person’s flat, the care worker will check for a WiFi option. If no WiFi is available or data connection using WiFi turns out to be poor, the selected home care service user cannot participate in the field trial and has to be replaced.

5.2.3 Roll-out plan for Switzerland

General strategy & timeline

In Switzerland, recruitment and field trial implementation will be led by the project manager of bonacasa (Emanuel Gfeller). He is the first contact person for concierges, the service hotline staff and other bonacasa staff members internally, as well as all CARUcares project partners for any end-user organization issues in Switzerland. After the successful recruitment of participants by the bonacasa staff around Emanuel, the distribution of CARU devices as well as the placement and activating the device will be done by the concierges who are in contact with the test persons.

CARU devices, which arrive at the end user partner BONA must have the latest update to avoid further efforts for employees in Innsbruck.

Table 4: Preparing the field trial in Switzerland

Date	Action	Who
16 to 19 February 2021	Go-NoGo Test , further actions if result is “Go” (otherwise rescheduling will be necessary)	BONA: Emanuel Gfeller, service hotline staff
20 Feb to 5 March 2021	Preparation of information sheets for recruitment	BONA: Emanuel Gfeller
8 to 31 March 2021	Recruitment of 25 participants, 4-6 concierges, 2 employees of service hotline staff; preparation of missing devices	BONA: Emanuel Gfeller and bonacasa staff
30 March 2021	Visit times of concierges sent to FHWN	BONA: Emanuel Gfeller
1 April	Allocation of devices and participants	BONA: Emanuel Gfeller
1 April to 15 April 2021	Distribution of CARU devices to test persons’ homes,	
15 April 2021	Start of trial phase	all

Measures taken to abide by the COVID-19 restrictions in Switzerland

According to current information (22 February 2021), concierges are still allowed to visit residents at their apartments. To comply with measures to protect test persons from a COVID-19 infection, only concierges will physically visit residents in their apartments. Without a physical contact between a concierge and a resident, the field trial cannot be executed. Whenever concierges visit test persons in their apartments, all measures to protect the latter from an infection are taken, such as the use of hygiene masks, disinfection spray, regular aeration by opening windows, or holding the minimum distance whenever this is possible.

Installation

The care workers select a place for CARU together with the service users in the service users’ homes according to CARU’s instruction manual. After plugging CARU in, both the concierge and the resident run a functionality test as stated in the instruction manual. In case of poor functionality, the trial participants will be supported by the CARU support team who check for adequate data connection. The support team might give advice on finding a CARU placement with better connectivity. If the data connection using CARU’s SIM-card is poor at

all possible locations in a person's flat, the care worker will check for a WiFi option. If no WiFi is available or data connection using WiFi turns out to be poor, the selected smart living residents cannot participate in the field trial and have to be replaced.

6 Methods for the evaluation of the CARUcares field trial

6.1 Overview

To achieve the evaluation goals of this field trial as outlined in the third section, a combination of quantitative and qualitative research techniques was selected for the evaluation of the field trial. Quantitative methods allow us a standardized evaluation, which will be used to assess technical functionality aspects. Using these types of methods, we will prepare test-scenarios implemented in an online-survey to evaluate functionality and first impressions of the trial participants. In addition, usage data will give insights into the use of the CARU device and its features. The evaluation of GPS tracking data will enable us to assess the precision of the prediction of the arrival of the care workers. Qualitative research techniques will allow us to investigate the perceptions of individual participants (care-workers, end-users and service hotline staff) in detail.

6.2 Data collection: surveys and interviews

We will follow a twin-track strategy for collecting functioning and user experiences. First, both service users and care workers will be asked to perform **short test scenarios** at the beginning of the trial period (max. one week after installation of CARU). Second, after some time for testing has passed (at least 4 weeks) with CARUs being integrated in their daily routine, service users and care-workers will participate in **semi-structured interviews** on their respective features. Interview guidance will be developed by WUWI by early Mai. The interviews will be conducted by WUWI for Austria and by HSLU for Switzerland.

For assessing behavior, we will collect **data on incoming calls at the service hotline** and **GPS location tracker**. This data collection will take place only in Austria.

Table 3 summarizes the methods used for the field trial, which will be explained below.

Table 5: Data collection methods for field trial by target group

	Online Questionnaire (Test-Scenarios)	Qualitative Interview	Short Interview (optional)	Call records	GPS tracker data
Service users	25 home care users in AT 25 smart living residents in CH End of April 2021: communication and notification features	5-10 home care users in AT 5-10 smart living resident in CH End of Mai 2021: communication and notification features perception of voice-supported documentation	-	<i>Austria only:</i> Service hotline staff record incoming calls from all clients. Start: 2 month before trial; end: end of trial Notification feature	
Care workers/ concierges	8 care workers in A 4-5 concierges in CH End of April 2021: documentation feature	5-8 care workers in Austria 5-8 concierges in CH End of Mai 2021 documentation feature perception of communication and notification features	-		<i>Austria only:</i> Location data: all care workers from Johanniter will use GPS trackers when on tour Notification feature
service hotline staff	-	-	2 members of staff Early June 2021: Communication feature		

At the beginning of the trial period, service users and care workers/concierges will be asked to conduct **test-scenarios** together and fill in a **short online-questionnaire**. Depending on the features, test-scenarios will be developed for the service users (notification and communication features) and for the care workers/concierges (documentation feature). A short online-questionnaire will help to collect relevant information on the experiences with the tests.

The test scenario and the short survey will be provided on a tablet, using the online survey tool LimeSurvey¹. Test-scenario questionnaires and the short survey will be developed by WUWI. For a period of 14 days, the concierges (CH) and care workers (AT) take tablets with the survey software with them to conduct the test-scenarios.

6.2.1 Test-scenarios and survey: documentation feature

Within the test-scenario period (see Section 6 - end of April 2021), **care workers/concierges** will test the documentation feature in real life situations. For that purpose, care workers will receive a tablet from their end-user organizations. They will take this tablet with them when visiting their clients/residents who participate in the trial. On the tablet, they will find the online questionnaire (developed by WU), which should be answered for each trial participant at least once during the test-scenario test period (2x25 tests in AT and CH, at least one real life test per participant). It is up to the care worker when she/he conducts the tests within the designated period for conducting the test scenarios (end of April-mid of May 2021).

Documentation lists must be ready to be used directly on CARU before the test week (mid of April 2021).

6.2.2 Test scenarios and survey: communication and notification features

Service users will test the communication and notification feature using **test scenarios**. In Switzerland, bonacasa will conduct the test scenarios with their residents. In Austria, WUWI and JOHA will conduct the test-scenarios with Johanniter's home care service users. The results of the tests will be filled in the test online test-scenarios questionnaire.

The *communication feature* is easy to test. A care worker or concierge can support conducting the test-scenarios on site and record the results in the online test protocol. If a call is issued during office hours, it will be taken by the service hotline staff / concierges. If a call is issued later, the call will be recorded on a mailbox. As a this test is only to be conducted once per client, end-user organizations need to make sure that home care service users/residents will

¹ LimeSurvey: limesurvey.org

be visited during *or* after office hours. In total – across the full country sample - both scenarios have to be tested.

Testing the *notification feature* is a bit more challenging. In Austria, the notification feature cannot be tested when a care worker is at the trial participant's home, an alternative way of testing and protocolling needs to be found. Thus, care workers will give trial participants a phone call 15 minutes before arriving at the trial participant's home. This is required to test the predictions using GPS data. Care workers can directly note down the results of the tests using the test scenario via LimeSurvey on the tablet or a computer. In Switzerland, the notification feature only uses crew scheduling data and announces arrival times as listed in schedule. As there is no use of GPS data, the test scenario can be started when the concierge has arrived at the trial participant's home. Care workers in Austria and concierges in Switzerland will be guided by the test scenarios implemented in the online survey software LimeSurvey.

For the **qualitative interviews**, semi-structured interviews will be conducted. Guidance for the interviews will be developed by WUWI at the mid of May 2021 and shared with the end-user partners. Semi-structured interviews will be developed based on Froschauer/Lueger (2003) and *user experience* literature. The interviews conducted in Austria will be transcribed, analyzed and drafted by WU, interviews with bonacasa clients and staff will be conducted, transcribed and analyzed by ihomelab (HSLU), who will also summarize the results in a short Swiss country report in English.

6.3 Data collection: call recording

In order to test whether the number of incoming calls at the care organization's service centre can be reduced by the CARUcare's notification feature, we asked call service staff in Austria to record the type of incoming calls over a period of 3.5 months. Commencing this data collection 2 weeks before the trial started will allow us to compare these data with potential changes during the trial phase. Data will be collected from all clients of Johanniter (trial participants and others). Service staff will note down the data, client and type of incoming call in an excel-file prepared by the WU Vienna University of Economics and Business.

6.4 Data collection: usage data and GPS tacking data

6.4.1 System usage data

For the whole period of the field trial, the technical partners collect data on the use of the CARU device and its features. Usage data for the CARU sensor (e.g. how often the box and each individual feature will be triggered) as well as for the individual features (e.g. which part

of the documentation is triggered) will be recorded. These data allow for an evaluation of the functionality of the device.

6.4.2 GPS tracking data

In order to be able to implement the CARUcares notification feature, also third-party systems (resource and mission planning tool of the care organizations) as well as real-time position data (Global Position System data – GPS data) will be used. The third-party systems are a first indication for predicting the arrival time of a care worker. For improving the precision of the arrival time prediction, the circumstances of a working day (delays or earlier arrivals) have to be considered. Thus, real-time position data (JGPS data) of all care workers (trial participants and others) will be used. The GPS data and the underlying prediction algorithm should enable a more accurate forecast of the actual arrival time. In the CARUcares project, the GPS data of the care workers will be used to assess the algorithm's performance and validity.

6.5 Data analysis

6.5.1 Usage data analyses

Usage data will be analyzed and reported on by CARU (use of the device), FHWN (notification feature) and HSLU (documentation feature).

For the evaluation of the CARUcares notification feature, the actual mission data of the care organizations will be used. The arrival time calculated by the algorithm will be compared with the actual time of arrival at the households of the home care service users in Austria. Therefore, for each trial day the GPS data as well as resource and mission planning data of the care organizations are stored pseudonymized in the back-end of FHWN. In the event that the participants use the feature infrequently or even rarely, a subsequent simulation for the evaluation will be possible with this real data.

6.5.2 Analysis of survey and interview data

In addition to the evaluation of usage data, for testing the functionality and first impression of user experience, test scenarios will be prepared by WUWI. The analysis will mainly use descriptive statistics. If the sample can be recruited as planned in terms of number and characteristics, also advanced analysis methods will be applied (e.g. regression models). The results of the field trial on the test scenarios will be provided by WUWI.

For the qualitative evaluation, interviews conducted in Austria will be transcribed and analyzed by WUWI using qualitative content analysis methods. Interviews conducted in Switzerland will be transcribed and analyzed by HSLU. The country reports will be pulled together to a final report on the results of the field trial using qualitative methods by WUWI.

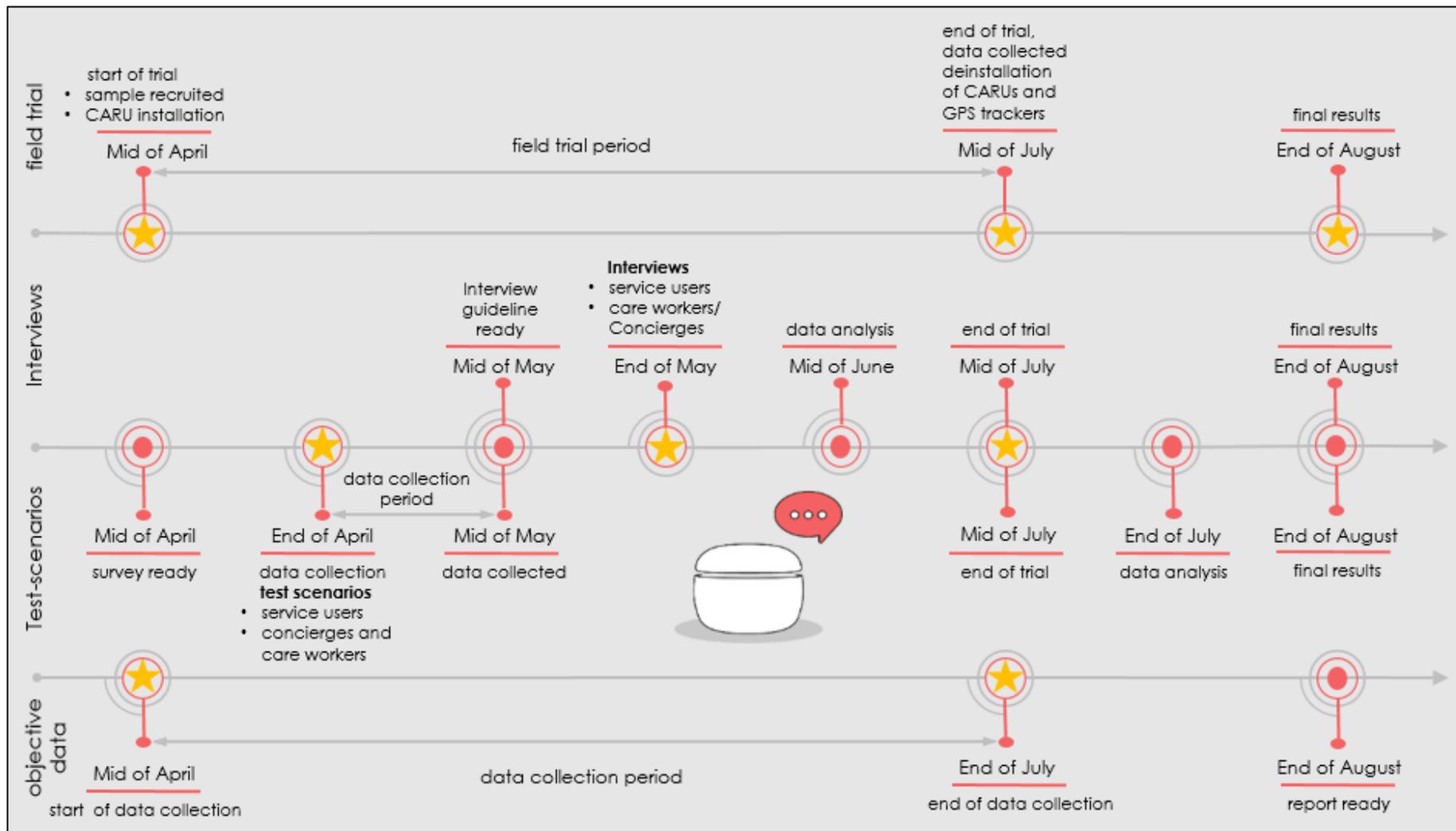
7 Timeline for the CARUcares field trial

Table 6: Timeline for the CARUcares field trial

	Test Scenarios and Online Questionnaire	Qualitative Interviews	Short Interviews with service hotline staff
Start trial period	15 April 2021		
sample recruited	15 April 2021	Mid of May 2021	End of May 2021
CARU installation done, users briefed	15 April 2021 – End users + care workers		
Survey/interview guideline ready	Mid of April 2021	Mid of May 2021	Mid of June 2021
Arranging appointments for the interviews		<p>Start mid of May:</p> <ul style="list-style-type: none"> care workers/concierges arrange interview appointments with service users (JOHA for WU; BONA for HSLU); appointments for interviews of concierges/ care workers shared with WU and HSLU 	
Data collection	<p>End April- Mid May 2021</p> <p>I. Test scenarios with service users (communication + notification feature)</p> <p>CH: Bonacasa AT: JOHA and WUWI</p>	<p>Mid – end of May 2021</p> <p>After at least 4 weeks of active usage of CARU</p> <p>I. Qualitative interviews with service users</p> <p>CH: HSLU AT: WUWI</p>	Mid – end of June 2021

	<p>II. Test scenarios with concierges/care workers (documentation feature) by care workers/concierges Questionnaire provided by WUWI.</p> <p>III: Objective data collection by JOHA; BONA and FHWN (Usage⁺, Usage Behavior⁺) Mid of April – Mid of July</p>	<p>II. Qualitative interviews with care workers/ concierges (care managers) CH: HSLU AT: WUWI</p>	
Transcription commission	-	End of April	End of May
Transcription		May – mid of June	Early June-Mid June
Data preparation	Early May– Mid of May	-	-
Data analysis	Mid of June – End of July	Mid June – Mid July	Mid of June - Mid July
Report writing	End of May – Early June	End July – Mid August	Mid – end of July
Deinstall. of CARUs	Mid of July	Mid of July	-
Deinstallation of GPS Tracker	Mid of July	Mid of July	-
CH-country report to be sent to WU	none	Mid August	End of July
End of Trial	Mid of July	Mid of July	Mid of July
Final results	Mid of July	End of August	End of August

Figure 6: Timeline of the CARUcares field trial



8 Literature

Froschauer, Ulrike; Lueger, Manfred (2003): Das qualitative Interview: Zur Praxis interpretativer Analyse sozialer Systeme. Wien: UTB facultas wuv.

Trukeschitz, Birgit; Kieninger, Judith; Ebner, Friedrich (2019): Heuristische Evaluierung des Smart Sensors CARU (inkl. Notrufarmband zum Zeitpunkt des Starts des AAL-Projekts CARUcares: Potenziale und Herausforderungen der bestehenden und geplanten Funktionen aus der Sicht der Projektpartnerin und Projektpartner in Österreich [Heuristic evaluation of the Smart Sensor CARU (incl. wristband) at the start of the AAL-project CARUcares: The Austrian project partners' perspective on the potential and challenges of the current and planned features] Unpublished Discussion Paper 2/2019 of the WU Research Institute for Economics of Aging, WU Vienna University of Economics and Business.