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Abstract (for dissemination)	In the present deliverable, we describe the evaluation framework of T&Tnet. Drawing from our observations from the user needs analysis study, included in deliverable report D.1.1, we outline a number of evaluation goals targeting interface aspects and older adults' needs in a mobility context. In addition, we present a set of evaluation methods which will carry the evaluation goals and provide the framework for the lab and field trials. The last section of the deliverable provides a detailed overview of the first lab trial setup, in which the paper mockups were evaluated with users in AT, NO, ES, FR.

T&Tnet

Travel & Transport solutions through emotional-social NETworking

T&Tnet: Travel & Transport solutions through emotional-social NETworking

AAL-4-032

Deliverable **D3.1**
Pilot Assessment and Evaluation Plan

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1 Introduction

1.1 Scope

With the present document, we aim to describe the methods, processes and rationale which will be used for the evaluations of the T&Tnet prototype, as it evolves from sketches to a fully functional application. The structure of this document starts from explaining **what** and **why** we will evaluate, then it continues explaining **how**, and it finishes with a first example of how we applied methods and rationale in the first lab trial.

In section 2, the evaluation goals are outlined. We drew the evaluation goals of T&Tnet from the User needs analysis study we performed [1], as it offered valuable insights on older adults' mobility, wayfinding and acquaintance with technology and provided us with information and examples on how they interact with their mobile phone. The evaluation goals pinpoint interface aspects that have to be included in the evaluations and suggest indicators to assess the concept, functionality and interaction design of T&Tnet.

In section 3, we describe the evaluation toolbox: a set of evaluation methods that will frame the evaluation goals. The description of the evaluation tools is kept in a general level, as in the course of the project, the methods will be adapted and combined to align with the prototype in development.

In section 4, the setup of the first lab trials with users is presented. The lab trials took place in all four countries (AT, NO, ES, FR) with 5 or less participants in each. The evaluation results from this lab trial will be documented in the deliverable D3.3 and will be used in the development of the first functional T&Tnet interface prototype.

1.2 The T&Tnet mobile and web prototype

The T&Tnet prototype will be actually developed for two platforms: web and mobile. The core concept, the functionality as well as the design should be consistent in both web and mobile platforms. Their main difference lies on the fact that users will use a web platform to prepare for a trip; thus they will have time, possibility of checking more options in other websites and will be able to print map printouts as navigation aid. On the other hand, a mobile platform will have to respond to immediate navigation needs of users. Its interface

should allow the inexperienced user to create a route and navigate step-by-step immediately, seeing first the necessary information and having easy access to other important information. Moreover, in the mobile platform, dynamic technical issues should be tackled; there is GPS correspondence, notifications regarding the route, etc.

For these reasons, we consider the mobile prototype as the most challenging and we will give priority to it when planning the first lab and field evaluations. After the first evaluations of the mobile application are completed, we expect to have a concrete idea about the core concept and information architecture that will be followed on T&Tnet; thus, we will base the design of the web application on the same principles and in coordination with the mobile. The two interfaces will be evaluated also separately later in the process, in order to define the elements that constitute the difference between them which is described above.

2 Evaluation goals

T&Tnet aims to provide an easy-to-use mobile and web-based navigation tool tailored to older users' needs. Nowadays, there are many navigation solutions available in the market. Nevertheless, as we discovered in the user needs analysis we conducted [1], these products often fail to support older users in their navigation tasks, because of interaction design issues, insufficient content or due to older adults' sceptical attitude towards technology.

In the course of developing useful functionality and interaction design for T&Tnet, evaluation will be a necessary process that will drive strategic and design iterations as well as keep the development team close to target users' needs. The evaluation goals, described in this section, stem directly from the explorative user needs analysis study we performed and define the evaluation focus: what do we need to evaluate and why. In addition, they provide criteria upon which T&Tnet will be assessed and highlight issues and interface aspects that need to be examined during the evaluation process.

In user-centered design, the evaluation process and goals evolve together with the product development. For instance, in the beginning, when paper mockups are only available, evaluation efforts should be focused on the validation of the concept and the interaction paradigms suggested, whereas in a fully functional prototype, performance, error rate and user experience can be additionally assessed. Therefore, the evaluation goals, as presented here, suggest areas of focus for the following evaluation sessions.

The goals cover the whole spectrum of users' interaction with the mobile application and will be addressed with qualitative and quantitative methods and techniques described in the evaluation toolbox (see section 3).

2.1 From older users' needs to evaluation goals

In deliverable D.1.1, we describe the user needs analysis study we performed with 49 participants in four cities: Zaragoza (Spain), Paris (France), Oslo (Norway) and Vienna (Austria). The goal of this study was to obtain a solid understanding of our target users' mobility patterns, their experience on mobile technology and their navigation habits. The study included focus group session, where adults older than 65 filled in a questionnaire, participat-

ed in discussions regarding these topics and brainstormed ideas for their ideal navigation application. After the focus group sessions, we conducted some user observation sessions, aiming at gathering additional insights on the users' interaction with current navigation technology. For the observation sessions, we selected from the focus group participants who owned a smartphone, we assigned each of the participants to a researcher-observer, and we asked them to navigate towards a predefined destination with the help of Google Maps.

We organized the findings from the study in 3 main categories: **physical interaction** includes all the aspects that define users' physical interaction with a mobile system; **content** refers to information and functionality older users consider important, while they are on the way; **user's attitude and understanding** refers to how users perceive mobile technology in relation to their navigation tasks.

Regarding **physical interaction**, we found that older adults face sensory limitations varying in degree that hinder their ability to control the device with gestures (e.g. pan, zoom in/out), listen to speech instructions or read the names of the streets on the map. Moreover, older adults do not wish to look at the screen or hold the device all the time, while they are navigating, due to the fact that they need to concentrate their attention on the street.

Regarding **content**, participants favoured practical information that would make their trip predictable (timetables, delays, opening hours) and comfortable (ticket purchasing, getting off notification, toilets, elevators, escalators) over entertainment information (tourist guides, or information for other users' activities). Moreover, the information required by participants, especially for public transit means and accessibility was different across the four cities, due to infrastructure and environmental conditions.

Regarding **user's attitude and understanding**, older adults are afraid of walking and holding a smartphone on hand as they are afraid of falling or attracting unwanted attention. In addition to safety, older users have privacy and lifestyle issues with mobile technology, but are willing to use it *"when it is necessary"*. They also have difficulties understanding technology; in case of Google Maps, the multiple results corresponding to a single query

can be confusing, the marking of a route unclear at first sight and the switching between different map screens overwhelming.

From the user requirements, design recommendations were derived which are summarized in Table 1, Table 2, Table 3 respectively for each of the three categories.

The taxonomy of users' needs, presented above, can actually serve as a framework for the evaluation of T&Tnet. Physical interaction, content and users' attitude and understanding cover the whole spectrum of the aspects that synthesize users' overall interaction with the product. In the following sections, we will map the evaluation goals of T&Tnet onto the three domains of users' requirements and present in detail which exact aspects and elements we aim to evaluate and the methodologies we will use to achieve our goals.

Table 1: Recommendations for physical interaction between user and application, stemming from the user requirements.

T&Tnet physical interaction		
'I don't want to attract attention'	ID.1	The interaction with the user should be **unobtrusive, subtle.**
	ID.2	User should spend **the least possible time looking at the device** to understand where he should go.
Touch interaction	ID.3	The application must provide **feedback** about the user's action on the screen.
	ID.4	The application should feature **big touch spots/buttons** and **a comfortable font.**

Table 2: Recommendations about the content of the application.

T&Tnet Content		
Social Network	C.1	It should not be necessary to **login in** order for the user to plan a route and navigate.
	C.2	The social network, if included as a component, should be minimal and **serve an actual goal** of older users.
Public means of transportation	C.3	The specific characteristics and parameters of each means of transportation should be taken into account when designing the application. E.g. Not all buses are accessible and their timetable is subject to traffic, road works, etc. while metro is usually accessible and reliable but not so

		safe at night.
Routes	C.4	Between a departure and a destination point, should be more than one routes available. Each route should be optimized for a parameter.
Timetables	C.5	The user must be informed about delays in public means of transportation.

Table 3: Recommendations for user's attitude and understanding.

User's attitude and understanding		
'I use it only when it is necessary'	M.1	Users do not want to spend time learning the interface. The use of wizards and pop-up windows which explain the interface should be eliminated. The interface should be **self-explanatory** (also see ID.4)
Usability requirements	M.2	There should be **few choices** shown and the hierarchy of choices must be kept low.
Actual position and orientation	M.3	The user should be able to understand without any prior knowledge/explanation his **location, orientation and destination** on the map.
Zoom in/out	M.4	The user should be able to understand how to **switch** between the overview (usually a map with the route drawn and markings of current position and destination) and the detailed view (street names) around his position.
'I lost my plan! How can I go back?'	M.5	If the user lands on a wrong view (e.g. by tapping imprecisely), she should be able to go back to her created view.
	M.6	The user should have access to her created route plan during the journey. Accidental wrong tapping shall not cancel/delete/undo the route plan.
Ignorance how it works	M.7	Precision, updates, orientation with GPS, availability of WiFi, signal issues have to be subtly explained.
Help contact	M.9	The user should have at his disposal a number she can call for help or instructions or questions wherever she is.

2.2 Physical interaction

The physical interaction between the user and the application includes the ways and patterns in which a user interacts with the application on a physical level, without taking into account how he perceives the application: from the moment the user will take out of her pocket or bag the smartphone and she will type an address to the gestures she will use to manipulate the map. The physical interaction also refers to the ways in which the external

physical surroundings and conditions influence the use of the application. Our evaluation goals are to examine the patterns of this physical interaction:

- **Looking at the device vs. looking at the street: how often do the users need to look at the device while navigating? Does this action pose a threat to their comfort or their safety?**

  We know from the user needs analysis study that the users wish to allocate their attention to their street and not on the smartphone or other distractions when they are navigating, as they have to avoid obstacles and accidents (e.g. when they are crossing a street). We believe that the time spent looking on the device to figure out location and direction to go, can be an indicator of the comfort of the physical interaction with the device. We could assess this parameter during field trials with the task-based method, namely asking users to perform predefined routes and logging the time patterns and other data of their physical interaction with the device.
- **Types and frequency of errors caused by physical user's input: how many and what kind of errors older users make when they give physical input to the application?** The ways of user input that will be included in T&Tnet are typing, gestures (for map manipulation) and pressing buttons and controls on the screen. Our goal will be to measure the error rate and understand the nature of input errors made on the interface. For this purpose, we need a (partially) functional prototype and some scenarios that require users' gestural or text input.
- **Comfort in physical interaction: Is the interface comfortable for them? Does it meet their vision and haptic capabilities and limitations?**

  In the evaluation sessions with older users, we will attempt to verify whether:
  - visuals and text are easily readable
  - users' input is minimum (only requested when necessary)
  - input modalities are tailored to older users' capabilities.

2.3 Content

The content refers to the different types of information available in the application and their structure. The content of an application is its main marketing point and the reason that users are interested in it at first place. It begins to take form already from the first rough conceptual sketches and is represented in its full development in the information architecture tree of the application. Evaluation of the content will take place from the first lab iterations of the paper mockups. We define as the most important evaluation goals for content in T&Tnet:

- **Perceived usefulness of the content: when users navigate, does the information presented on the application meet their needs?**

  It becomes evident from the user needs analysis study that older users value information that will make their trip comfortable and predictable. The term "comfort" is used here to describe accessibility in a broader sense; this state or potential that allows users to avoid physical pain. Elevators and toilets are two examples of information that were shown to cover comfort needs of older users. The evaluation methodologies of the perceived usefulness vary from gathering qualitative input to items measuring usefulness in the standardised questionnaires, UMUX, TAM3 and HED/UT (see subsections 3.2.1, 3.2.2, 3.2.3).

- **Consistency of the content: how do users perceive the concept of the application? Do all different types of information available in the application fit into one concept?**

  Consistency is important because it reflects on the ways users perceive and describe the application; as a comprehensive and concise concept or as a compilation of irrelevant pieces of information? It is often the case that applications initially built with a broader spectrum of information and functionality, end up focusing on a fraction of what they initially intended to offer, based on the feedback of their audience. The consistency of the T&Tnet concept will evolve through qualitative interviews with users and expert re-

views. In particular, expert reviews assessing consistency will focus on evaluating the information architecture tree of the application, a tree-like construct of all the different paths offered by the application. Moreover, asking users for their overall impression of the application can also be an effective way of discovering aspects perceived as important/unimportant by users.

- **Meaningful prioritization: when users navigate, is the information presented to them in the order and priority that information needs occur?**
  The goal of prioritization is to ensure that the most important information for the task is highlighted and accessed with the minimum possible effort (or in the minimum possible steps) by users. The prioritization of information is best evaluated during field trials, when a user is performing a navigation task and actual information needs arise (e.g. buses timetables, information about a street block, etc.). There it can be defined in detail which information pieces have to be visible at first place and which can be hidden under an extension button. Prioritization can also be improved at earlier stages in the first lab trials with qualitative evaluation methods, such as interviews with users and expert reviews.

2.4 Users' attitude and understanding

The term "users' attitude and understanding" refers to opinions, thoughts and well-established behaviour patterns of the target users that interfere with their use of a mobile application. This includes also their understanding or expectations of how a system should work. Our evaluation goals related to users' attitude and understanding are:

- **To address the one-time users: is the system's basic functionality easy-to-use for the first-time user? Does the user understand what action causes which effect and how to do a particular action?**
  In user needs analysis study, we found that older users are willing to use the technology "only when it is necessary" and this implies that they will not probably use it often enough so that they get acquainted with it. Therefore, all our users can be considered first time users; not only for the first time they use the device and but also even some months after downloading the application.

Designing for first-time users aims to promote recognition rather than recall; users need not to remember the interface, but rather to be able to immediately recognise it. Special emphasis on recognition should be given to:

- **The interface controls and the menu**: is the menu using the vocabulary of the user? Can the user perceive the menu choices in relation to the tasks she has in mind?
- **The map marking:** can the user tell once a route is created, where is his destination, departure point and current position?

This parameter is taken into account in evaluation sessions that involve users, as they are almost always confronted with an interface they have no experience on.

- **Understanding of technical issues and errors: How are errors and technical issues handled in the interface? Does the user understand the technical side of the product?**

  We will have to evaluate the messages and notifications that pop up in cases such as the GPS fails, there is available WiFi to join, internet connection fails, map cannot be loaded, etc. These are technical issues that older users might not be aware of, thus they should be adequately explain to maintain users' trust on T&Tnet. Except from technical issues, users are confused by lack of feedback, when they perform an action on the interface or when their expectations are not met (for example, typing an address in the input textbox and receiving more than one results on the map). The evaluation goal is to focus on creating a classification framework for different errors that occur during the interaction and propose solutions for each error class separately.

3 Evaluation toolbox

The evaluation toolbox consists of a set of methodologies that will be primarily used in the T&Tnet evaluation sessions. In this section we are going to describe the methodologies in a general manner and in chapter 4 we will discuss in detail how we applied them for the first lab trials of the paper mockups.

3.1 A task-based approach

One of the standard methodologies used in usability evaluations worldwide, is to ask a target user to complete a specific task on the interface [3]. The setup usually consists of a study facilitator, a participant, optionally some observers and video/audio recording equipment. The participant is usually requested to find the solution to the task without assistance and to think aloud, namely to communicate her thoughts on the interface, revealing her problem-solving process. The facilitator can encourage the participant to share her insights by asking questions.

This is a basic setup that can take place in the lab and can be adapted according to the development stage of the prototype. At the first stages of the user-centred iterative process, the tasks created for the study represent the most common scenarios users will perform on the application and are tested on clickable mock-ups or paper [2]. At later stages, particular features that are being developed define the tasks that will be included in the study. Nowadays, there are many variations of the task-based approach that allow even for remote studies with the help of specialised software tools.

The task-based approach offers qualitative insights regarding user's perception of the interface and the concept as well as quantitative, when combined with standardised questionnaires and measurement of error rates and task completion time. Task-based studies, conducted early on in the development of a product, can spur ideas, elicit changes and updates in the concept and the interface and drive the next iteration cycle of development.

3.2 Questionnaires

3.2.1 UMUX

The standardised questionnaire UMUX measures perceived usability and it is designed to produce scores similar to SUS, but using only four items [4]. UMUX has a general question ("This system is easy to use") and three more questions from SUS associated with **efficiency**, **effectiveness**, and **satisfaction**, which had the highest correlation to the overall SUS score. The four UMUX items are:

1. This system's capabilities meet my requirements (effectiveness)
2. Using this system is a frustrating experience (satisfaction)
3. This system is easy to use.
4. I have to spend too much time correcting things with this system (efficiency).

3.2.2 TAM3

The Technology Acceptance Model (TAM) was originally developed as an instrument to predict the likelihood of a new technology being adopted. The structure of TAM is determined by **perceived usefulness,** which is defined as the prospective user's subjective probability that using a specific application system will increase one's job's performance and **perceived ease of use,** which refers to the degree to which the prospective user expects his interaction with the target system to be free of effort [6]. TAM has been widely used and gained reputation for successfully highlighting differences in user behaviour. The model was extended by Venkatesh and Davis in 2000 to include critical influence factors outside of perceived usefulness and perceived ease of use (TAM2). The TAM3 (see Figure 1) is the latest model for technology acceptance and it is widely used to determine the adoption of information technology systems [5].

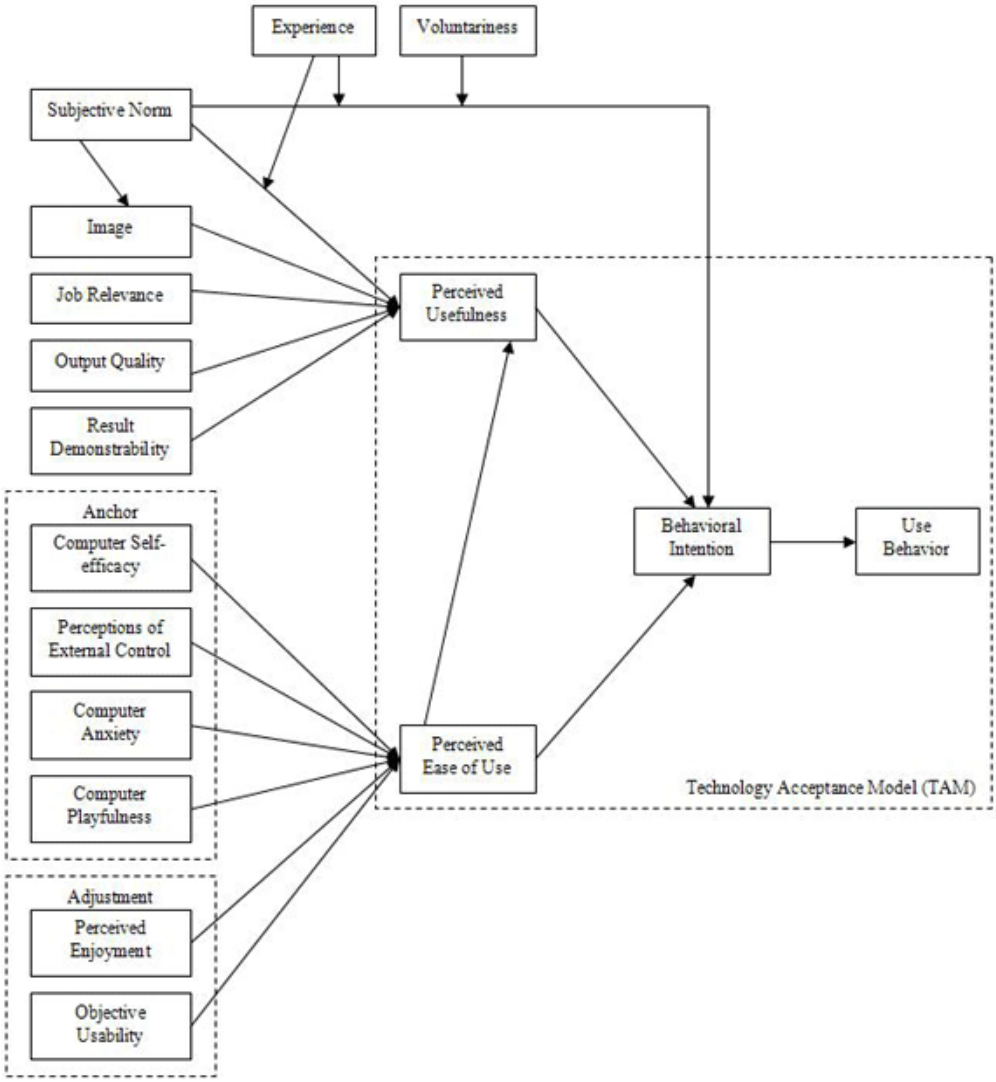

Figure 1: The TAM3 model.

3.2.3 HED/UT

The HED/UT questionnaire is a two-dimensional consumer attitude scale, consisting of 12 items measuring **hedonic** values and 12 measuring **utilitarian** values [7]. The HED/UT was initially designed for evaluating the consumer attitude towards products and for benchmarking between similar products of different brands. It was included in the Handbook of Marketing Scales [8], a book well received by marketing researchers. Since then, the scale was proven reliable in many product domains, among which interaction design and user experience.

3.3 Expert review

Expert review is a usability evaluation technique that relies solely on usability experts. For this reason, it is resource and time-efficient, and according to Molich [10], its quality is comparable to the conventional usability tests with users. One of the most well-known methodologies for expert reviews is the heuristic inspection, a usability inspection method where the extent to which the interface is aligned with recognised interaction design principles (the "heuristics") [9] is examined. The heuristics, which were developed by Nielsen and Molich in the 90's, are the following:

- Visibility of system status
- Match between system and the real world
- User control and freedom
- Consistency and standards
- Error prevention
- Recognition rather than recall
- Flexibility and efficiency of use
- Aesthetic and minimalist design
- Help users recognize, diagnose, and recover from errors
- Help and documentation

Although the heuristic evaluation is perhaps the most documented expert review methodology that exists, Molich in Comparative Usability Evaluation (CUE) study found that in practice, usability experts apply many different techniques to assess an interface, ranging from task-, persona- or scenario- based approaches to benchmarking of competitive sites [11].

For T&Tnet, we will recruit three to five usability experts from CURE to evaluate the interface. Although interpreting the term "usability experts" is ambiguous, we will consider as such persons who have 3 or more years of experience with usability evaluations of web and mobile interfaces. The experts will be given no instructions regarding the evaluation methodology, but they will be asked to report the methodology they used.

3.4 Benchmarking

Another method that could be used in combination with the above-mentioned methods is benchmarking. Benchmarking is the process of comparing different products in respect to some particular factors/indicators and it finds various applications in industry (examples: [12], [13]). Benchmarking is particularly meaningful in our case, since there are already widely available general-purpose navigation applications, and we have to make sure that T&Tnet performance is better tailored for older users compared to other applications. We believe that using benchmarking as an evaluation method will set the quality standards for T&Tnet higher, thus leading to better results. Moreover, evaluating the performance of different navigation applications will help us make crucial design decisions and avoid pitfalls found in existing products. However, we recognize that it will be difficult in the course of the project to reach the level of maturity of these successful commercial applications that are already for years in the market and have collected feedback and data from millions of users.

Benchmarking will be applied when some functionality is already developed in the system. The stage of development will determine the indicators according to which the products will be judged. A possible set of indicators will be related to content: for example, what kind of accessibility information do similar applications offer in comparison to T&Tnet?

In Table 4, the evaluation goals, described in chapter 2, are mapped to the evaluation methods presented in this chapter. The mapping is indicative, as T&Tnet concept is still in the beginning, but in later stages of the development, we will be able to precisely define the methodologies that will be used to address different evaluation goals.

Table 4. An indicative mapping of evaluation goals to methods from the evaluation toolbox.

Evaluation goals	
T&Tnet physical interaction	
The impact of allocating attention on smartphone while walking on the street	task-based approach

Evaluation goals	
Types and frequency of errors caused by physical user's input	task-based approach, benchmarking
Comfort and alignment with target users physical capabilities	benchmarking
Content	
Perceived usefulness of the content	TAM3, HED/UT, UMUX
Consistency of the content	TAM3, expert review
Meaningful prioritization	expert review
User's attitude and understanding	
Addressing first-time users	task-based approach
Understanding technical issues and errors	task-based review

4 First lab evaluation of the paper mockups

The lab evaluation sessions of the paper mockups took place in Zaragoza (ES), Vienna (ES), Paris (FR) and Oslo (NO) with 5 (4 for France) subjects for each country. The sessions include evaluation tools described in the previous section, adapted to the paper mockups available at the time of evaluations. In this section, the evaluation process for the first lab trials will be described in detail.

4.1 Human and material resources

The paper mockups evaluation session was carried out by one facilitator who was in charge of welcoming the participant, describing the scope of the project, asking questions, encouraging thinking-aloud and keeping notes of the participant's comments. In the room of the study, there were:

- Audio/video recorders placed so that they capture the interaction between the participant and the mockups
- A laptop for entering information directly to an excel sheet (results form) (not absolutely necessary)
- The 8 scenarios and the screens for each scenario printed.
- Pre-questionnaire, TAM3, HED/UT and UMUX (1 for each scenario)
- Pens and blank paper

4.2 The timeline of the study

The facilitator follows the timeline shown in Table 5.

Table 5: The schedule followed for the first lab trial.

Time (in min)	Activity
0-5	Introduction
5-10	Informed Consent
10-15	Pre-questionnaire
15-20	1st scenario
20-27	2nd scenario
27-34	3rd scenario
34-41	4th scenario

41-48	5th scenario
48-60	Break
60-67	6th scenario
67-74	7th scenario (*)
74-81	8th scenario (*)
81-90	TAM3 questionnaire
91-97	HED/UT questionnaire (*)
97-107	Post-interview
107-115	Conclusions, thanks, goodbye!

(*) These parts of the schedule were optional, thus performed only if there was time available, as in FR and NO, the first pilot sessions with users lasted longer than estimated.

4.2.1 Introduction

The facilitator briefs the participant into the goals of T&Tnet project and explains the assignment:

I will give you some scenarios and will ask you to perform the actions on the mockups to fulfil each scenario. Because our prototype is not ready yet, we will pretend that this is an actual mobile phone and whenever you press something on the paper screen, I will bring up the screen that corresponds to your action. It will be very helpful for our research if you express your thinking process during the scenario loud. I would like to inform you that our intention is not to judge you or your abilities, but only our designs and ideas. So feel free to ask any question or make any remark, because you are helping us understand what is wrong or right with our mockups. During the process and in the end, we will ask you to fill in some questionnaires. Thank you very much!

4.2.2 Informed Consent

The participant receives an Informed Consent (IC) that must be read and signed by her in order to participate.

4.2.3 Pre-questionnaire

The multiple choice pre-questionnaire examines how acquainted are the participants with technology related to T&Tnet.

1. Have you used/heard of one of the following? (I often use x, I have used x at least once, I know what it is, I have no idea what it is)
    a. Smartphone?
    b. Tablet?
    c. WiFi?
    d. GPS?
    e. Email?
    f. Facebook?
    g. Google Maps?

These technological products can be used with T&Tnet in different ways. Smartphone is the main T&Tnet platform and tablet is a prospective platform, WiFi offers opportunities for access to maps when data roaming is not available, while experience with GPS can save from frustration when the signal fails, etc. The questionnaire aims to give us some insights on participants' former experience with the domain.

4.2.4 Scenarios -Tasks

The facilitator first informs the participant about the scenario and her task and encourages her to **proceed and think aloud while navigating, without guidance**. The participant is asked to use the paper mockups as she would use a real application and press the controls with her finger. If the participant makes a wrong choice, she is encouraged to try again. Upon the completion of the task, participant is given the UMUX questionnaire to fill in and the facilitator asks questions regarding interface elements, interaction aspects and how the concept is perceived. The part where the participant attempts on her own to solve the task was called round A of the scenario and the part where the facilitator intervenes with questions is called round B.

The 8 scenarios selected for the first lab trials represent the most important features of the mockups. The following 8 scenarios and respective tasks were assigned to the participants.

Scenario 1 – Menu and "more" submenu

In the first scenario, the participant is asked for her first impressions on the main menu and its extension. After participant fills in the UMUX questionnaire, she is asked to describe the functionality of each icon of the screen and categorize them in most and least important.

Scenario 2 – Settings

The second scenario-task requires from the participant to adjust the settings of the application while thinking aloud. After UMUX, the participant is asked if the settings are meaningful for her, what she thinks about speech commands, colour and font, etc.

Scenario 3 – New route

The participant is shown the main menu and she is asked to create a new route to a predefined destination. After UMUX, the participant is asked about the sequence of screens she saw, her perception of the map, what kind of address input she prefers and if the information available on the map is sufficient.

Scenario 4 - Visibility to friends

The participant is shown the main menu and she is asked to inform her friends through T&Tnet about her location. After UMUX, she is asked to give her opinion on the functionality offered by the social part of T&Tnet.

Scenario 5 - Saved routes gallery

From the main menu, the participant is requested to access the saved routes, select a specific one and then navigate with it. After UMUX, the participant is asked to say what she thinks is the functionality of each control on the screens.

Scenario 6 – Get tip

The scenario assumes that the participant is in the middle of a route and she needs to search in T&Tnet for the nearest public toilet. After filling in UMUX, the participant is asked about icons on the map, and if the facilities information offered is relevant for her.

Scenario 7 – Give tip

In this scenario, the participant is requested to post some review in the system about the accessibility of a place she just visited. After UMUX, the facilitator asks the participant if she would be willing to give a tip to the system and her opinion on the ways of input (text, symbols, pictures) to the system.

Scenario 8 – Give feedback

The scenario assumes that the participant has reached her destination and the application shows a screen which asks for feedback on the route. After UMUX, the facilitator asked the participant whether she would give feedback, if she would be interested in other users' feedback, etc.

4.2.5 Post Interview and questionnaires

When all scenarios are completed, the facilitator hands in the TAM3 and HED/UT questionnaires to the participant in order to fill them in. Finally, the facilitator interviews the participant regarding her overall experience and what she would wish to change to the system.

5 Discussion

In this document, we described the evaluation goals, namely our questions regarding the interface and issues that arose already from the user needs analysis. Some of them propose evaluation criteria for the interface (e.g. the time users spend looking at the device versus the time they spend looking at their environment while navigating), some draw the attention to specific interface elements that might be crucial for our target users (e.g. map marking). The tools and methodologies presented in section 3, derived from usability practice and research, will be the 'carriers' of the evaluation goals. In other words, the methodologies will be combined to provide a frame and the evaluation goals will be the central theme of the lab and field trials.

The first lab trials have been completed and their results will drive an iteration of the concept and information architecture towards the first mobile prototype with some inbuilt functionality. The following lab and field trials will be defined in detail during the course of the project, according with the development of the prototype. This means that if X functionality is developed until the next evaluation phase, the evaluation framework will be adapted with the appropriate methodologies and evaluation goals to assess the X functionality. A firmly fixed evaluation methodology –for example, a repetition of the first lab trial methodology with a defined number of users– from the beginning to the end would perhaps leave space for comparison between different development phases, but it would not make efficient use of resources and would not provide an in-depth analysis of why certain functionalities are appreciated while others fail.

The outmost goals of the evaluation process are to ensure that developers' work is aligned with users' needs; that mistakes in the concept direction or interaction will be corrected from early on and finally that users will appreciate and understand T&Tnet as a unique navigation tool that enhances their ability to find their way. Having a well-defined set of methodologies and goals, as we attempted in this document, is the first step towards this direction.

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Annex A: Focus group manual

This document contains the description of the paper mockups evaluation session of T&Tnet.

Human and material resources

The paper mockups evaluation session can be carried out by one facilitator (at the minimum) who will be in charge of welcoming the participant, describing the scope of the project, asking questions, encouraging thinking-aloud and keeping notes of the participant's comments. It is however recommended - both for comfort but also for validity and for ensuring better coverage of participant's views - that 2 researchers conduct the study: 1 serving as the facilitator, 1 as the observer. In the room of the study, except from refreshments and snacks for the participants, there should be:

- Audio/video recorders placed behind participant's shoulder
- A laptop for entering information directly to an excel sheet (results form) (not absolutely necessary)
- 8 stacks of paper, 1 for each scenario
- Pre-questionnaire, TAM3, HED/UT questionnaires
- Markers, pens in reach to the participant
- Blank paper

The facilitator should have in front of her all 8 stacks of paper (that include round A and round B of each scenario) and the questionnaires. The observer should have 8 stacks of paper (only round B), blank papers and (optionally) the laptop with the results form (xls) in front of her. Round A and Round B of scenarios will be described in detail in following sections.

Setup checklist

Tasks	Check
3 DAYS BEFORE	
Translate the app screens of the scenarios and the questionnaires.	

Book the evaluation facility.	
Ask one of your colleagues to be the **observer**.	
Prepare and send instructions for the participants how to find the facility.	
Print **5 Informed Consent forms** (assuming that number of participants is 5; consider some extra copies as give-away for the participants).	
Print 5 Prequestionnaires,TAM3, HED/UT.	
Print this protocol.	
Arrange material resources.	
Arrange n incentives for participants.	
8 HOURS BEFORE	
Check camera.	
Place all the materials on the table.	
In order to save some time from the participant, write her name, date, etc. beforehand on the questionnaires and on the stack of papers where notes are kept.	
Place refreshments on the table.	
Rehearse, rehearse, rehearse!	

Facilitator tips

- Chat with the participant until she forgets she is being recorded.
- Explicitly encourage each participant to **think aloud** about their actions on the tasks given.
- Listen to what your participant says. Do not make any judgments. Just **nod your head** to show that you understand her.
- Emphasize to the participant that the mockup is being judged, not her abilities.
- **Offer no direct help**. If the participant gets stuck, ask her "do you see anything on this screen that could perhaps help you with this task?" or "how would you proceed?"
- If the respondents ask your help, **ask them back**: e.g. 'I don't know. What do you think?'
- Dig below top-of-the-mind answers. **Find out why and how.**
- If a question confuses a respondent, rephrase it.

- **Failure is an acceptable outcome**. If the user is frustrated, stressed or doesn't have an idea how to continue with the task for quite some time, then ask her if she wants to continue with the next task or else, debrief and end the test.

Timeline

Time (in min)	Activity
0-5	Introduction
5-10	Informed Consent
10-15	Pre-questionnaire
15-20	1st scenario
20-27	2nd scenario
27-34	3rd scenario
34-41	4th scenario
41-48	5th scenario
48-60	Break
60-67	6th scenario
67-74	7th scenario
74-81	8th scenario
81-90	TAM3 questionnaire
91-97	HED/UT questionnaire
97-107	Post-interview
107-115	Conclusions, thanks, goodbye!

Introduction

We (from now on, *we* refers to the facilitator and observer) welcome the participant and explain the process:

Welcome to our lab! We are participating in a large-scale European project called T&Tnet that aims to develop a mobile navigation application targeted especially towards senior citizens. We have designed a first draft of this application and we would like to have your opinion on it.

I will give you some scenarios and will ask you to perform the actions on the mockups to fulfill each scenario. Because our prototype is not ready yet, we will pretend that this is an actual mobile phone and whenever you press something on the paper screen, I will bring up the screen that corresponds to your action. It will be very helpful for our research if you express your thinking process during the scenario loud. I would like to inform you that our intention is not to judge you or your abilities, but only our designs and ideas. So feel free to ask any question or make any remark, because you are helping us understand what is wrong or right with our mockups. During the process and in the end, we will ask you to fill in some questionnaires. Thank you very much!

Informed Consent

The participant receives an Informed Consent (IC) that must be read and signed by her in order to participate. To ease the procedure and shorten the time, you can go through the document together with the participant and explain the information in the IC form step by step.

Pre-questionnaire

The pre-questionnaire examines the relationship of the participants with technology and in particular with technological products relevant to T&Tnet, such as smartphone, tablet, GPS, etc. It can be found in the folder "Pre-questionnaires".

2. Sex
3. Age
4. Have you used/heard of one of the following? (I often use GPS, I have used GPS at least once, I know what it is, I have no idea what it is)
    a. Smartphone?
    b. Table?
    c. WiFi?
    d. GPS?
    e. Email?
    f. Facebook?
    g. Google Maps?

Scenarios

We run each scenario in two rounds:

A. Round A or *Thinking aloud*

First, we describe the scenario and encourage the participant to **proceed and think aloud while navigating, without guidance**. We explicitly ask from the participant to imagine that this is a real prototype and ask her to place her hand on the right button on the screen, even if it is just plain paper in front of her. If she doesn't make the right choice, the participant is allowed to try another button and in this case, we ask *"why you made this choice?"*. If the participant is stuck on a screen, we ask: *"How would you proceed?"* If the participant brings up an issue, we can ask questions on it, but we do not try to guide her observations.

B. Round B or *Post-experience*

The goal is to find out in more detail what the participant thinks about the application and if she approves the ideas and features embedded. So, we first ask from the participant to fill in the UMUX questionnaire. Then, we start again from the first screen of the scenario and **draw participant's attention on every detail**: e.g. What does the participant think every button on the screen does? What does she think about a feature? What is her opinion on the aesthetics? What would she change? etc.

Scenario 1 – Menu and "more" submenu

Round A

- Description of the scenario:

  This is the main menu of T&Tnet application. What do you think about it?
- Participant is (encouraged to, if necessary) thinking aloud.

Round B

- UMUX questionnaire
- Additional questions that could be asked:
  - For each icon on this screen, can you describe what do you think its function is?
  - Which icons do you think are the most important? Why?
  - Which are not so important? Why?

Scenario 2 – Settings

Round A

- Description of the scenario:

  You will now adjust the settings of the application. Which icon would you press to do this? Please let us know what you think for every screen you run across.

- Participant is (encouraged to, if necessary) thinking aloud.

Round B

- UMUX questionnaire
- Additional questions that could be asked:
  - Would you customize an application to your preferences?
  - What do you think about this screen (screen explaining that the user will customize the app)? How would you react to such a screen? Would you read or skip it?
  - How do you find the colour combination? Font size?
  - Would you turn it to speech messages? Why/Why not?
  - What do you think will happen if you press "cancel"?
  - Is this information interesting for you?
  - What do you think about the quantity of the preferences?
  - What do you think about the content of the preferences?

Scenario 3 - New route

Round A

- Description of the scenario:

  You want to go from where you are now to Mollergata street. What would you do?

- Participant is (encouraged to, if necessary) thinking aloud.

Round B

- UMUX questionnaire
- Additional questions that could be asked:
  - What do you think about this question (create a trip from your current position to home or other goal)? Do you usually need to create a trip to home? Do you want to input your address to the system?

- Would you prefer pointing at a map, writing the address or another way of input?
- What would you do to find where you are right now on the map?
- What do you think about this information (route information)?
- How would you go back to the map?
- What do you think about the whole process of creating a route with T&Tnet?
- Do you miss any information?

Scenario 4 - Visibility to friends

Round A

- Description of the scenario:

  Now, you want to inform your friends about your position. How would you do that?
- Participant is (encouraged to, if necessary) thinking aloud.

Round B

- UMUX questionnaire
- Additional questions that could be asked:
  - What do you expect each of these options do (other options beside show/hide position)?
  - How do you think you can interact with Anna and Peter?

Scenario 5 - Saved routes gallery

Round A

- Description of the scenario:

  You want to access your saved routes and go from Oslo S to Youngstorget.
- Participant is (encouraged to, if necessary) thinking aloud.
- Questions:
  - After the first 2 screens: *what do you think will happen if you press the arrow?*
  - Similarly: *what do you expect to happen when pressing the square (text) icon?* Show it on the screen. *What about the question mark and the stop icon?*

Round B

- UMUX questionnaire
- Additional questions that could be asked:
    - Do you want to access your saved routes and go from Oslo S to Youngstorget?
    - What do you think will happen if you press the arrow?
    - What do you think will happen if you press the text icon?
    - What about the question mark and the stop icons?

Scenario 6 – Get tip

Round A

- Description of the scenario:

  Let's assume you are wandering in the city and you need to find on the map the nearest public toilet. How would you do that?
- Participant is (encouraged to, if necessary) thinking aloud.

Round B

- UMUX questionnaire
- Additional questions that could be asked:
    - Do you understand what the i button is? What else could it be?
    - What do you think + and – are for?
    - Is the information included here relevant for you?

Scenario 7 – Give tip

Route A

- Description of the scenario:

  You have just eaten at a restaurant and you are very pleased by the fact that it is accessible for wheelchair users. You want to enter this information on the system. How would you do it?
- Participant is (encouraged to, if necessary) thinking aloud.

Round B

- UMUX questionnaire
- Additional questions that could be asked are:
    - Do you write a tip on a place you visited? Would you do it? Why/why not?

- What do you think about the „give tips“ icon?
- What do you think about these three options?
  - Take photo
  - Only text
  - Use symbols
- What do you think about typing on a smartphone?
- What do these symbols mean?

Scenario 8 – Give feedback

Round A

- Description of the scenario:

  You reached the end of your route. This icon pops up. Please navigate and think aloud about the process and the screens.

- Participant is (encouraged to, if necessary) thinking aloud.

Round B

- UMUX questionnaire
- Additional questions that could be asked are:
  - What do you think about this screen?
  - Would you fill it in after your route was over?
  - What do you think about receiving other users feedback?
  - What kind of feedback are you interested in?

Post Interview /questionnaires

The post-questionnaires are the TAM3 and HED/UT. The post-interview consists of 4 questions that will be orally asked to the participant?

1. What is your overall impression of the mockups?
2. Which were the best parts? Please give me 3 positive aspects.
3. Which were the worst parts? Please give me 3 negative aspects.
4. How would you redesign it? What would you change? Would you like to sketch some ideas down on paper?

Throughout the study the participant, can review previous screens and scenarios and he should be encouraged to do so. Moreover the facilitator can at any time, preferably during round B refer or ask a question from a previous screen.

Annex B: Informed Consent

T&Tnet: Travel & Transport solutions through emotional-social NETworking

INFORMED CONSENT

Title of the Project:	**T&Tnet** - Travel & Transport solutions through emotional-social NETworking
Website:	http://ttnet-aal.eu/
Coordinator:	**Víctor Sánchez** ISOIN, c/Astronomia 1, Torre 4 planta 3ª, 41015 Seville. Phone: +34 954 21 90 13, Mail: vsanchez@isoin.es
Leading Local Investigator:	Markus Garschall
Institution:	CURE – Center for Usability Research & Engineering
Financed by:	EC, BMVIT, FFG
Programme:	AAL Joint Programme (AAL JP) http://www.aal-europe.eu/
Call:	AAL – 4th call – ICT based solutions for Advancement of Older Persons' Mobility
Project Number:	AAL– 2011 – 4 – **032**
Project Type:	Cooperative Project
Project Duration:	30 Months
Project Start - End:	1 July 2012 – 31 December 2014

The study described in this document is part of the research project " *T&Tnet - Travel & Transport solutions through emotional-social NETworking* ". The European Union (EU) and the BMVIT on behalf of the FFG finance this project under the AAL Joint Programme (Project number: AAL-2011-4-**032**).

This informed consent document may include words that you may not understand. If that is the case, please ask the contact researcher or any other staff of the study to fully explain the meaning of the word or piece of information you do not understand. You may take a copy of this consent to think about it or talk to your family before making any decision. At all times, we assure the compliance of the current legislation.

I. INTRODUCTION

You have been invited to take part in a research study of the *T&Tnet* project. Before making a decision on whether you want to participate or not, please read this document carefully. Please ask all the questions you may have so you can be completely sure that you understand the scope and procedure of the study, including risks and benefits.

II. PURPOSE OF THE STUDY/PROJECT

The general objective of the *T&Tnet* project is to develop a navigation application targeted especially towards senior citizens. The T&Tnet application will offer navigation and accessibility information, social networking, emergency services etc. and will be customized in real time according to specific user preferences and needs.

The outmost goal of this project is to develop technology that will support seniors in living an independent and active life, thus improving their quality of life,

III. PARTICIPANTS IN THE STUDY AND POSSIBLE PARTICIPATION

We kindly request your voluntary participation in this research study. This informed consent includes information on the following research study. We would like to assure that you are perfectly informed about the purpose of the study and what your participation in it implies.

Please ask to clarify any section in this informed consent document you do not understand. Please, do not sign if you are not sure that you have understood all the aspects of the study and its objectives.

The participation in this study is totally voluntary. You can give up at any moment without being penalized.

The criteria for participating in this study are as following:

- **Age:** The participant is equal to or above 65 years old.
- **Mobility:** The participant is mobility independent and can arrive to the study facilities without assistance.
- **Experience with ICT:** Prior experience with computers is not necessary, but she/he should be at least motivated to use technology.
- **Sensory system:** She/he has no profound hearing or vision loss. Moreover, she/he has good haptic sense and they are able to tap on a smartphone screen with precision.
- **Literacy:** She/he is literate as she/he should be able to read and understand instructions.

At the end of the study you will receive a financial compensation for your contribution, depending mainly on the duration and nature of the study you participated.

IV. PROCEEDINGS:

Within the *T&Tnet* project users of the above defined target group will be invited to requirements, lab and field trial studies of the developed system prototypes. Within these studies users will have the chance to give information on requirements, needs and wishes in early project phases. In further project phases users have the chance to try the prototypes (lab trials, field trials) and give feedback concerning usability and user experience that will be used to refine and optimize the system. Participants will have to perform specific tasks related to the prototype as well as to answer questionnaires and interviews regarding user experience and usability aspects of the system. Lab studies will be audio and video recorded for backup and analysis reasons. Field trials will include diverse log-file recordings.

Place of the Study:

- Austria: CURE Experience Labs

- Norway: KARDE and SeniorNett
- France: AP-HP
- Spain: ITA and Zaragoza City Council

Duration of the Study:

- Focus Groups / Requirements Phase: ~ 2 hours
- Lab Trials / Usability Evaluation: ~ 1,5 hours

V. RISKS OR INCONVENIENT

No risks are foreseen. You are only requested to be available to participate in the study.

VI. BENEFITS

The benefit from participating in any study of the *T&Tnet* project is that you can make a substantial contribution to the development of future technologies focusing on the enhancement of the quality of life of older persons and supporting an independent life-style

VII. PRIVACY AND CONFIDENCIALITY

Your registered and/or recorded responses will not include any personal identification information. Hence, it will not be possible to identify you after your participation in any study. Recorded information will be processed during the phase of data analysis and will be included in project internal reports or later in scientific publications. It will not be possible to identify the source of the information, observing at all times:

Austria: The „Bundesgesetz über den Schutz personenbezogener Daten (Datenschutzgesetz 2000 - DSG 2000)"

> "According to the law aforementioned, we inform you that all provided personal data that will be scientifically analysed will be coded from CURE so that it will not be possible to identify your name or other personal information about you in the results of the scientific analysis. All provided personal data will be stored in a file store that can only be accessed by partners that are active involved in the *T&Tnet* project. None of the provided personal data will be handled out to third parties."

The results of this study may be published in scientific magazines, conference proceedings or books. Complete anonymity of personal data is guaranteed by the *T&Tnet* partners.

The authorization for the use and access to this information with study purposes is completely voluntary. This authorization is valid until the end of the study unless you decide to cancel it before. If you should decide to deny your consent, please contact the leading investigator and let her/him know of your intention of leaving the study.

You can contact the leading investigator at the following address:

Markus Garschall

CURE

Modecenterstraße 17

Objekt 2

1110 Vienna

Austria

+43.1.743 54 51.209

garschall@cure.at

From the moment you withdraw from the *T&Tnet* project, your data will not be used in any further phase of the project. However, documents that have already been published or are parts of the study that have been finished will not be able to be altered.

Your decision to whether or not give your authorization for the use and diffusion of the information provided by you is completely voluntary. However, if you do not provide us with your authorization now or if you cancel it in the future, you will not be able to participate in this study.

VIII. CONTACT PERSONS

For further information about your rights as a participant in the investigation, or if you are not satisfied with the way this study is being carried out, or if you have any question or complaint during the investigation, please contact the leading investigator:

Markus Garschall

CURE

Modecenterstraße 17

Objekt 2

1110 Vienna

Austria

+43.1.743 54 51.209

garschall@cure.at

IX. CONFIRMATION

Your participation in this study is only possible if you freely and independently sign this informed consent document to authorize us to use the data you provide. If you do not wish to do so, please do not subscribe and do not participate in this study.

I have read the information in this informed consent document or the information has been read to me in an adequate way. All of my questions about the study and my participation in it have been answered.

Mark one of the following with an X:

__I read all the information in this form.

__The information in this informed consent was read to me by: ……

All the questions that I had have been answered by: ……

I authorize the use and analysis of my answers to the entity aforementioned for the purposes above indicated. Signing this informed consent does not imply giving up to any legal rights. I accept in a voluntary way to participate in this investigation carried out by CURE and the rest of the partners of the *T&Tnet Project*. I understand that I have the right of having a copy of this informed consent. Therefore, a copy will be provided to me.

Name and surname of the participant:

……

Date:

……

Signature of the participant

……

Name and surname of the researcher

……

Date:

……

Signature of the researcher:

……

X. PHOTO, VIDEO AND AUDIO RECORDING

The study is led by:

Markus Garschall

CURE

Modecenterstraße 17

Objekt 2

1110 Vienna

Austria

+43.1.743 54 51.209

garschall@cure.at

As part of this research project, photograph, videotape and audiotape recordings during the participation in the study will be done.

I have received a thorough description of the purpose and procedures for any recordings and I give my consent to allow CURE use the recordings or parts of the recordings for analysis, related studies and project results, as well as for marketing and PR purposes of *T&Tnet*. I understand that all information will be kept confidential and will be reported in an anonymous way.

Name and surname of the participant:

……

Date:

……

Signature of the participant

……

Name and surname of the researcher

……

Date:

……

Signature of the researcher

……

Annex C: Questionnaires used in the study

Mobile technology questionnaire

Participant number:_____
◯ Male ◯ Female
Age: _____

a. Have you used/heard of one of the following?

a. Smartphone?
◯ I often use a smartphone.
◯ I have used a smartphone at least once.
◯ I know what it is.
◯ I have no idea what it is.

b. Tablet?
◯ I often use a tablet.
◯ I have used a tablet at least once.
◯ I know what it is.
◯ I have no idea what it is.

c. WiFi?
◯ I often use WiFi.
◯ I have used WiFi at least once.
◯ I know what it is.
◯ I have no idea what it is.

d. GPS?
◯ I often use GPS.
◯ I have used GPS at least once.
◯ I know what it is.
◯ I have no idea what it is.

e. Email?
◯ I often use email.
◯ I have used email at least once.
◯ I know what it is.
◯ I have no idea what it is.

f. Facebook?
◯ I often use Facebook.
◯ I have used Facebook at least once.
◯ I know what it is.
◯ I have no idea what it is.

g. Google Maps?
◯ I often use Facebook.
◯ I have used Facebook at least once.
◯ I know what it is.
◯ I have no idea what it is.

Scenario 1

UMUX Questionnaire

Name:_____Surname:_____Date:_____Facilitator:_____

Please read the following statements about the scenario you just completed and tick in the appropriate circle to indicate to what extent you agree or disagree with them.

		I strongly disagree	I disagree	undecided /neutral	I agree	I strongly agree
1.	This system's capabilities meet my requirements.	O	O	O	O	O
2.	Using this system is a frustrating experience.	O	O	O	O	O
3.	This system is easy to use.	O	O	O	O	O
4.	I have to spend too much time correcting things with this system.	O	O	O	O	O

Participant's Number:_____Date: _____

Facilitator:_____

HED/UT Questionnaire

Please tick a box in the following lines to indicate what impression you have from the T&Tnet prototype.

	very	quite	neutral	quite	very	
useless	O	O	O	O	O	useful
impractical	O	O	O	O	O	practical
unnecessary	O	O	O	O	O	necessary
unfunctional	O	O	O	O	O	functional
unhelpful	O	O	O	O	O	helpful
inefficient	O	O	O	O	O	efficient
ineffective	O	O	O	O	O	effective
harmful	O	O	O	O	O	beneficial
unproductive	O	O	O	O	O	productive
dull	O	O	O	O	O	exciting
disgusting	O	O	O	O	O	delightful
boring	O	O	O	O	O	fun
serious	O	O	O	O	O	playful
unthrilling	O	O	O	O	O	thrilling
unenjoyable	O	O	O	O	O	enjoyable
unamusing	O	O	O	O	O	amusing
cheerless	O	O	O	O	O	cheerful

TAM3 Questionnaire

Name:_____Surname:_____Date:_____
Facilitator:_____

Please read the following statements about T&Tnet and tick in the appropriate circle to indicate to what extent you agree or disagree with them.

		I strongly agree	I agree	undecided /neutral	I disagree	I strongly disagree
PU1	Using the system improves my performance in my task.	O	O	O	O	O
PU2	Using the system in my task increases my productivity.	O	O	O	O	O
PU3	Using the system enhances my effectiveness in my task.	O	O	O	O	O
PU4	I find the system to be useful in my task.	O	O	O	O	O
PEOU1	My interaction with the system is clear and understandable.	O	O	O	O	O
PEOU2	Interacting with the system does not require a lot of my mental effort.	O	O	O	O	O
PEOU3	I find the system to be easy to use.	O	O	O	O	O
PEOU4	I find it easy to get the system to do what I want it to do.	O	O	O	O	O
	I could use a mobile application…					
CSE1	…If there was noone around to tell me what to do as I go	O	O	O	O	O
CSE2	…if I just had the built-in help facility for assistance	O	O	O	O	O
CSE3	…if someone showed me how to do it first	O	O	O	O	O
CSE4	…if I had used similar packages before this one to do the same job.	O	O	O	O	O

		I strongly agree	I agree	undecided /neutral	I disagree	I strongly disagree
PEC1	I have control over using the system.	O	O	O	O	O
PEC2	I have the resources necessary to use the system.	O	O	O	O	O
PEC3	Given the resources, opportunities and knowledge it takes to use the system, it would be easy for me to use the system.	O	O	O	O	O
PEC4	The system is not compatible with other systems I use.	O	O	O	O	O
	The following questions ask you how you would characterize yourself when you use computers.					
CPLAY1	... spontaneous	O	O	O	O	O
CPLAY2	... creative	O	O	O	O	O
CPLAY3	... playful	O	O	O	O	O
CPLAY4	... unoriginal	O	O	O	O	O
CANX1	Computers do not scare me at all.	O	O	O	O	O
CANX2	Working with a computer makes me nervous.	O	O	O	O	O
CANX3	Computers make me feel uncomfortable.	O	O	O	O	O
CANX4	Computers make me feel uneasy.	O	O	O	O	O
ENJ1	I find using the system to be enjoyable.	O	O	O	O	O
ENJ2	The actual process of using the system is pleasant.	O	O	O	O	O
ENJ3	I have fun using the system.	O	O	O	O	O
BI1	Assuming I had access to the system I intend to use it.	O	O	O	O	O
BI2	Given that I had access to the system, I predict that I would use it.	O	O	O	O	O
BI3	I plan to use the system in the next n months (when released).	O	O	O	O	O