

Key Usability and Ethical Issues in the NAVI programme (KEN)



Deliverable 5

Adaptation of Technology and Usage Cultures

PART I

VERSION 1.2

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Tiivistelmä

Yksi KEN-projektin tehtävistä on ollut tutkia ja kartoittaa henkilökohtaisen navigoinnin tuotteiden ja palveluiden potentiaalisia käyttäjäryhmiä ja käyttökulttuureita. Perinteisesti navigointiin liittyvinä tuotteina voidaan pitää karttaa ja kompassia sekä erilaisia opastuspalveluita. Satelliittipaikannusteknologiaa (GPS – global positioning system) on hyödynnetty yhä laajemmin 1990-luvun loppupuolella laitteiden halventuessa ja satelliittipaikannuksen tarkentuessa. GPS on yleistynyt jopa siinä määrin erilaisten harrastajaryhmien (esim. veneilijät, metsästäjät) käytössä, että ehkä pian sekin voidaan luokitella yhdeksi perinteiseksi navigointia helpottavaksi menetelmäksi.

Uusien ja kehitteillä olevien paikannusteknologioiden (esim. A-GPS, WLAN, Bluetooth) sekä vanhojen paikannusteknologioiden (esim. GPS, solupaikannus) hyödyntäminen yhä laajempien kuluttajaryhmien käyttöön on luonut aivan uudenlaisen lähtökohdan navigointituotteiden suunnittelulle, tuotteistamiselle ja markkinoinnille. Käsite 'henkilökohtainen navigointi' pyrkii kuvamaan tätä lähtökohtaa, jossa uutta teknologiaa hyödynnetään laajasti erilaisten kuluttajaryhmien tarpeita tarkastellen.

KEN –projektin Teknologian omaksuminen ja käyttökulttuurit -tutkimusosion ensimmäisessä vaiheessa keväällä 2001 keskityttiin henkilökohtaisen navigoinnin piiriin kuuluvien uusien tuotteiden käyttökäskenaarioiden arvioimiseen erilaisten potentiaalisten käyttäjäryhmien parissa. Tutkimustilanteessa osallistujat arvioivat asiantuntijoiden koostamien henkilökohtaisen navigoinnin tuotteiden käyttökäskenaarioiden hyödynnettävyyttä ja uskottavuutta kuluttajan näkökulmasta. Tutkimuksen avulla kartoitettiin asenneilmapiiriä: ennakkoluulot, pelot, uhat vs. mahdollisuudet, toiveet, odotukset, olemassa oleva kysyntä, maksuvalmius uusista palveluista ja käytettävyysskriteerit. Lisäksi potentiaalisia käyttäjiä pyydettiin ideoimaan uusia navigointituotteita sekä käyttötilanteita ja –tarpeita esitettyjen skenaarioiden lisäksi niin omalla kohdallaan kuin muitakin käyttäjäryhmiä tarkastellen.

Potentiaalisten uusien henkilökohtaisen navigoinnin tuotteiden kuluttajien/käyttäjien lähestyminen skenaarioiden esittelemisen ja arvioimisen kautta oli tuolloin (1. vuosineljännes 2001) ainoa mahdollinen tapa auttaa tutkimukseen osallistuvia hahmottamaan uudenlaiset tuotteet ja palvelut. Alkuvuonna 2001 ei uudenlaisia henkilökohtaisen navigoinnin piiriin kuuluvia tuotteita ollut kuluttajien saatavilla juuri nimeksikään ja kaiken kaikkiaan jo pelkkä käsite *henkilökohtainen navigointi* tai paikannusteknologian hyödyntäminen erilaisissa palveluissa oli varsin vierasta suurimmalle osalle kuluttajia.

Haastateltavien ryhmät olettivat ammattikäyttäjien, erilaisten harrasteryhmien (esim. purjehtijat ja metsästäjät) ja nuorten olevan ensimmäisiä henkilökohtaisen navigoinnin alaan kuuluvien sovellusten hyödyntäjiä. Reittiopastus vieraassa ympäristössä mainittiin erityisen käytännölliseksi ja tarpeelliseksi. Paikannettuihin pyyntöpalveluihin (location-based pull services) suhtauduttiin yllättävänkin positiivisesti haastateltujen ryhmien keskuudessa. Henkilöt, jotka suhtautuivat mainontaan yleensäkin negatiivisesti, eivät halunneet sitä uudentyyppisten medioidenkaan avulla tuotettuna. Sisätilanavigoinnille nähtiin hyödyntämismahdollisuuksia erityistilanteissa (esim. erityisen suuret tilat) ja erityisryhmillä.

Paikannusteknologiaan liittyen ryhmissä keskusteltiin vilkkaasti yksityisyyden suojasta sekä uusien teknologioiden mahdollistamasta lisääntyvästä turvallisuudesta ja kontrollista. Yleisesti ottaen ryhmissä suhtauduttiin epäilevästi sellaisiin sovelluksiin ja ympäristöihin, joissa henkilöä pyritään ohjaamaan tai kontrolloimaan henkilön pystymättä itse aktiivisesti vaikuttamaan riittävästi ympäristössä toimiviin sovelluksiin. Arkea helpottavat henkilökohtaisen navigoinnin sovellukset hyväksyttiin, mutta uuden teknologian mahdollistamaa lisääntyvää tehokkuutta esim. työssä tai kontrollin lisääntymistä vapaa-aikana esim. perheenjäsenien kesken pidettiin epätoivottavana. Uusien teknologisten sovellusten kohdalla pelättiin myös: 1) ihmisten välisen kanssakäymisen muuttumista luonnottomaksi; 2) niiden huonoa käytettävyyttä ja 3) uusien tuotteiden hyödyntämistä liian kapealla sektorilla.

Tässä raportissa esitellään myös eri organisaatioiden edustajien näkökulma paikannuksen hyödyntämisestä erilaisissa ammattiympäristöissä. Haastattelut ammattijärjestöjen edustajien kanssa toivat esille, että tarpeet erilaisille navigointipalveluille ja -tuotteille vaihtelivat niin eri teollisuusalojen välillä kuin tietyn teollisuusalan sisälläkin. Haastattelujen pohjalta työympäristöihin liittyvä henkilökohtaisen navigoinnin sovelluksien hyödyntäminen voidaan jaotella seuraavasti:

1. Työnantaja haluaa tietää (ja seurata), missä hänen kalustonsa (ja sen mukana työntekijä) liikkuu
2. Työntekijä tarvitsee apua löytääkseen mahdollisimman helposti ja nopeasti (uuteen) paikkaan
3. Työntekijä tarvitsee paikkakohtaista (paikkaan sidottua) tietoa
4. Paikkatieto halutaan liittää tuotteeseen tai logistisen ketjun eri vaiheisiin



Abstract

One of the tasks of the KEN project (Key Usability and Ethical Issues in the NAVI programme) is to examine the potential usage cultures of navigation services and devices.

This report presents results the evaluations of navigation scenarios with potential user groups. Thirteen different groups were selected to evaluate the scenarios written by technology experts. The purpose of these evaluations was to study how credible and useful potential customers considered the scenarios. Another purpose was to identify needs of the user groups for navigation services and let the participants innovate new navigation services. The evaluations were carried out as group discussions. Beside the group discussions there has been interviews with experts of elderly care and rescue services to complement the information of some special groups. The scenario evaluations and interviews focused on personal navigation in consumer use. The report also presents organisational perspective of potential user groups in working environments. This material was collected in interviews with representatives of the management of different organisations. VTT Building and Transport was responsible for this section of the report.

The user groups that we interviewed assumed that the first users for PNS (Personal Navigation Systems) would be found among different professionals and among the people that need extra guidance (including professionals caring for these people). Special interest groups like yachters and hunters already use GPS and VHF navigation devices. These kind of groups will probably be among the early adopters of the new services and products if they detect those as practical solutions for their use. In the interviews, young people were also generally mentioned as the first users of PNS even though some of the youngsters themselves did not see themselves as going on forefront in using PNS.

Route guidance in unfamiliar places was generally seen extremely practical. Wilderness, hobbies related to nature, and cities were mentioned in all the user groups as places where the PNS could be usable. Commercial services and ads based on location were seen amazingly acceptable in the groups. People who did not want ads today did not want them either in future with another media. Most of the people considered location based ads useful since one could precisely define what kind of bargains one wants to receive and one could make exact search entries for needed items. Indoor navigation was seen rather useless for an ordinary user. In special situations and for special groups it was however mentioned as a practical application.

Alongside with privacy the issues of safety and control were discussed widely in the interviews. Criticism towards new technology was brought up in many groups. Predestined and over-controlled environment was seen dubious. Participants in the user groups mainly wanted solutions to ease their life in some functions but they did not want their life to become totally controlled by the demand of super-efficiency. Fear of radical changes in human interaction, usability of systems and narrow use of new services and products were commented generally in the groups.

Discussions with trade union chairs showed that the needs of navigation services both within the same branch of industry as well as between different branches of industry differ. Heavy truck and lorry drivers can be mentioned as examples. Some vehicles are built and equipped for one special industry, and have already navigation systems developed for the specific tasks of the employees. For instance the forest industry in Finland has navigation systems in 90% of its fleet. Drivers delivering daily consumer goods have mostly daily routine routes and have only seldom new customers. Instead, drivers for example delivering goods for building sites or collecting animals for slaughterhouses often have to visit new customers.

According to the interviews the professional services needed can be divided into four groups:

- 1) The employer has to know where the employee is
- 2) The employee has to find to an unknown destination
- 3) The employee has to get detailed information about the place where she/he currently is
- 4) Location-based information must be added to goods for delivery or pick-up.

This report is the first version of Deliverable 5 by the KEN project. The purpose of this report is to present the results of preliminary studies on usage cultures and adaptation of technology as well as general knowledge of navigation services and devices. Based on the feedback from the NAVI programme and the development of the markets the studies of usage cultures and technological adaptation will continue throughout the KEN project. The next version of the report will be delivered on 30.10.2002.

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1 Introduction

1.1 Purpose

Key Usability and Ethical Issues in the NAVI programme (KEN project) is one of the horizontal support projects in the Personal Navigation (NAVI) programme of the Ministry of Transport and Communications in Finland. The aim of the KEN project is to assure that usability and ethical issues are taken into account in the projects of the NAVI programme. Together with the projects, we are identifying and solving usability and ethical problems related to personal navigation.

One of the tasks of the KEN project is to examine the potential user and usage cultures of navigation devices and services. New navigation technology is not yet very common and people in general are not familiar with new navigation services and technology. For that reason we decided to examine potential user groups by using scenarios.

This report presents the results of the navigation scenario evaluations with potential user groups. Thirteen different groups were selected to evaluate the scenarios envisaged by experts. The purpose of these evaluations was to study how credible and useful potential customers considered the scenarios to be. Another purpose was to identify the needs of the user groups for navigation services and to let the participants innovate new navigation services. Besides the group discussions, interviews with experts in care for the elderly and rescue services were conducted to complement the information on some special groups.

The products and services for personal navigation were presented to the user groups in pictured scenarios. Every group evaluated 3-5 scenarios, which presented different perspectives of the products and services for personal navigation. Our goal was to chart how much the user groups currently know about navigation services and devices and what kind of experiences they have had of navigation in general. The use of scenarios was intended to help people to understand the idea of personal navigation and then to elicit the ideas, attitudes, opinions and needs of different user groups with regard to navigation services and products.

In addition to the scenario evaluations and interviews focused on consumer use of personal navigation systems, the report also presents the organisational perspective of potential user groups in working environments. This material was collected with the aid of interviews with representatives of management of different organisations. VTT Building and Transport was responsible for this section of the report.

This report is targeted at anyone participating in the design of products and services for personal navigation and does not require any background knowledge about personal navigation.

1.2 Scope

This report is the first version of Deliverable 5 of the KEN project. The purpose of this report is to present preliminary studies of usage cultures and technological adaptation and knowledge of navigation services and devices. The analysis is based on interviews made in February and March 2001. Based on feedback from the NAVI programme and the development of the markets, the studies of usage cultures and technological adaptation will continue throughout the KEN project. The next version of the report will be delivered on 30.10.2002.

1.3 Definitions, Acronyms, and Abbreviations

In this report we use the term ‘user culture’ to suggest that a particular group of people are potential users of personal navigation devices or services. As long as they are not using any real services, we cannot yet speak about persons belonging to some ‘usage culture’. In fact, it is sounder at this stage of the study to use the term ‘user culture’ than ‘usage culture’. User culture defines the determinants of a potential group and this is what we have done now. If we had tried to focus on the usage culture of different groups, we should have had a different kind of a research model. Instead of using scenarios, we should have studied more precisely the present use of personal navigation devices and services, or done some pilot tests on the use of such services or devices in natural situations. However, this was not possible because navigation services are not yet commonly in use.

GPS = Global Positioning System

GSM = Global System for Mobile Communications

PNS = Personal Navigation System

VHF = Very High Frequency

1.4 Overview

In Chapter 2 we present the model of the study and the selected groups. The results of the group discussions and other interviews are presented in Chapter 3. This includes the most important themes that emerged from the material. Chapter 4 presents the perspective of professional users. Chapter 5 concludes the results and outlines further research on potential user groups and already existing PNS usage cultures.

2 Materials and methods

2.1 Group discussions

The scenarios were delivered to most of the groups in advance. If this could not be done, the scenarios were presented more thoroughly than otherwise in the group discussion situation. Introducing the participants to the scenarios in advance was thought to be useful for the sessions because the idea of personal navigation with new technology is not so well-known in general in different customer groups. The intention was to assemble 14 different potential user groups for group interviews. The optimum size of the groups was planned to be 2 -5 persons. The scenarios were accompanied by a letter and a description of the NAVI programme to explain the idea and products of PNS (e.g. mobile phones and distributed system in locating services or people).

The discussions were recorded on mini-discs. The participants filled in questionnaires of background information and gave their consent for the study. Group discussions were held in February and March 2001.

2.2 Scenarios

Scenarios are used as a method or tool e.g. in future studies, task analysis and in concept design. In our study scenario is defined similarly as in concept design. It is a tool to visualise a possible way to act in a particular

situation. It helps potential users to understand imagined applications and services of new technology (here PNS).

The scenario method was chosen because scenarios are a flexible way of finding out user attitudes and needs quickly. One obvious benefit of scenarios is that they treat technology quite flexibly: either it can be represented in detail or the focus can be more on the context of use. However, when the emphasis of the research is on the situation and context only, scenarios help to illustrate the setting. A basic scenario consists of a narrative that describes the use of a certain, even imaginary, product. A scenario should portray 1) the users, 2) the situation in which the product is used, 3) the ways and customs of usage, 4) the basic functions of the product, and 5) the benefit derived by the users. (Keinonen 2000, 208). In the end the scenarios were written in the form of illustrated narratives. This way the scenarios could be changed and adjusted flexibly.

The research team gathered 14 different scenarios. 3-5 scenarios were selected for the evaluation by each group. Some of the scenarios were edited and pictured from previous documents of the NAVI programme (Kaivo-oja et. al., 1999). The KEN project group also wrote new scenarios. KEN project report D2, Products and Services for Personal Navigation - Classification from the User's Point of View (Kaasinen & Ahonen, 2001), was used as a reference to ensure that the various aspects of personal navigation were taken into account in the scenarios for each group. Different scenarios were selected for different groups to help them to identify themselves in the story presented in a scenario (focused scenarios). Some of the scenarios were evaluated by most of the groups (all-round scenarios), their aim being to clarify different aspects of PNS more widely in the society. Two of the scenarios (Junk mail and Exhibition) were, however, evaluated by almost all of the groups because they presented some aspects that were not included in the other scenarios. The scenarios used in the evaluation were:

1. **Tarzan** going to the city with Terk (a monkey) to meet Jane at the Zoo.

- outdoor navigation
- route guidance
- locating persons
- location-based commercial services (ads)
- paying with the device
- finding lost friend

2. Visiting Helsinki with the **Twins**

- mother is visiting a strange city with twins by public transport
- outdoor navigation
- route guidance
- service centre
- travelling by bus in a strange city
- timetables
- location-based commercial services (ads)
- paying with the device
- finding specialities

3. Visiting **Exhibition**

- business man visiting exhibition
- indoor navigation
- Pre-arranged and guided tour of exhibition
- social navigation
- profile - business card

4. Whole family in **Levi**

- family on holiday at a skiing centre
- outdoor navigation

- route guidance
- locating group
- social navigation
- finding lost people

5. **Junk mail**

- employee is on a day off when he first get ads to his navigator and then his boss locates him and asks him to make a service call to a customer. Location-based commercial services (ads)
- route guidance
- locating an employee

6. **Rita and boys**

- Rita is making dinner at home and wondering where the boys are at the moment
- locating children

7. **Sailing** to Stockholm

- Family is sailing to Stockholm to visit there the exhibition of Pablo Picasso
- outdoor navigation by boat, bus, and on foot
- indoor navigation and tour guide in museum
- location-based commercial services (ads)
- locating friends
- locating emergencies

8. **Pub** Lighthouse

- person is looking for friends in the city after a hard day at work
- social navigation
- locating services

9. House **party**

- a boy is going to a house party by bus, looking there for friends and new faces, returning home by taxi
- social navigation (finding friends)
- outdoor navigation
- indoor navigation (house)
- route guidance (optimal route of various alternatives)
- profile services (finding new friends)

10. **Billiard**

- two boys are looking for their friends and entertainment for the evening
- outdoor navigation
- social navigation (locating friends)
- location-based commercial services (ads)

11. To **afternoon dance** and back

- an elderly gentleman goes to a dance by bus, meets there his friends and a charming lady, and after the dance returns to his home by taxi
- social navigation (finding friends)
- outdoor navigation
- indoor navigation (dancing hall)
- route guidance (optimal route from various alternatives)
- profile services (finding new friends)

12. Emma 2035

- story of a lady who has Alzheimer disease and uses PNS
- indoor locating services
- outdoor locating services
- finding person (sick person)
- PNS in professional use (home aid, service centre)

13. Abroad

- a family is going to Estonia by boat when suddenly one of the group has a heart attack
- indoor navigation (hospital)
- outdoor navigation, route guidance (ambulance, family in a strange city)
- social navigation (family members)

14. Ride-sharing

- a man is looking for his friend in the morning to pick him up
- outdoor navigation, route guidance
- social navigation (finding friend)
- locating other people (security system warning about children on their way to school)
- car navigation

2.3 Selected groups

Fourteen different groups were selected for the study as potential users of personal navigation. The intention was to maximise the diversity of the customer groups. Groups at different stages of life were selected to include the various needs of persons from children to the oldest of the old. Also some special groups, like hunters, were included in the study to determine the focused needs of personal navigation for these groups. It was intended that elderly persons suffering from memory disorders would make up one potential user group. However, it proved to be very difficult to assemble such a group for the scenario evaluations. For this reason we ended up gathering the opinions of this group by other means and in the group discussions we finally had thirteen different groups.

Many interesting groups were left out of this study because of the timetable and the limited resources e.g. bird-watcher and different juvenile groups. However, this is not seen as a problem because of the nature of the research at this stage. In qualitative analysis the purpose was in general to gather attitudes, opinions and ideas about different themes (e.g. reasons that promote or delay the implementation of personal navigation, the adaptation of new technology, and the formation of new user segments) by interviewing different kinds of customer groups. In gathering persons to the groups it was not thought that the criterion of gender was important at this stage of the study, and for that reason the gender division is somewhat male focused

The groups in the study were from Tampere, Lempäälä, Tuusula, Kärsämäki and Oulu. Tampere is a city in western Finland with 193 000 inhabitants. Lempäälä is a middle-sized town near Tampere with 16,000 inhabitants. Oulu, a city in the northern part of Finland, has the sixth largest population of all the Finnish cities. In January 2000 the city had 117,680 inhabitants. Kärsämäki is a small town situated 125 kilometres south of Oulu. There are just over three thousand inhabitants in Kärsämäki. Tuusula is a municipality in the greater Helsinki area, with a population of 30,000.

The scenarios presented in the previous chapter were split up among the groups as follows:

Families

Families (2), children 0-12 years old Families (2), children 10 years and older

Tarzan	Levi
Twins	Exhibition
Exhibition	Junk mail
Levi	Rita and Boys
Junk mail	

Adult interest groups

Boaters Football players Hunters

Sailing	Pub	Pub
Exhibition	Party	Party
Levi	Exhibition	Exhibition
Junk mail	Levi	Levi
	Junk mail	Junk mail

Youth groups

Walkers – Lempäälä Kärämäki - high school

Party	Party
Exhibition	Exhibition
Billiard	Billiard
Junk mail	Junk mail

Active Aged

Students of well-being technology

Exhibition	Afternoon dance
Afternoon dance	Emma 2035
Emma 2035	Junk mail
Junk mail	Pub

Disabled

Handicapped Visually impaired

Abroad	Abroad
Pub	Pub
Exhibition	Exhibition
Junk mail	Junk mail
Ridesharing	

2.3.1 Families 1

The families with small children were from Oulu and Tuusula. In both cases the interviews were held at the homes of the participants. The family in Oulu has two children, a girl aged eight and a boy aged 9 months. The family lives in an old wooden house near the city of Oulu and, according to the father, repairing it is a hobby. The father and the mother were not very interested in using new telephone technology. The mother has had a mobile telephone for four years (partly for work use) but the other members of the family have no mobile telephone of their own. The parents use PCs at work and in their university studies (over 30 hours weekly per person).

Family #1 (Oulu)						
Gender	Age	Profession	Has a GSM phone?	Regular computer use?	Hobbies	Has used a navigation device?
man	39	traffic inspector	no	yes	building (do-it-yourself)	no
woman	36	researcher	yes	yes	reading, jogging	no

The family living in Tuusula consisted of four persons: father (entrepreneur), mother (student of new media), boy (5 years) and girl (3 years). The family also had two cats. The parents were rather interested in new technology: both of them had mobile phones and several (3-4) computers in household. The parents used PCs at home 20-30 hours per week per person. The father was also doing some IT-support work for organisations.

Family #2 (Tuusula)						
Gender	Age	Profession	Has a GSM phone?	Regular computer use?	Hobbies	Has used a navigation device?
woman	34	student	yes	yes	computers, music	no
man	36	entrepreneur	yes	yes	literature	no

2.3.2 Families 2

The members of this affluent four-person family present at the interview were the father, mother and teenaged daughter. The family lives in Lempäälä. The participants could be described as having an active lifestyle with many hobbies. All the members of the family had a mobile phone and were familiar with computer use. The father of the family had prior experience of navigation devices, whereas the mother and the daughter had never used a navigation device. The discussion was held at the premises of VTT Information Technology in Tampere. Two interviewers were present.

Family #3 (Lempäälä)						
Gender	Age	Profession	Has a GSM phone?	Regular computer use?	Hobbies	Has used a navigation device?
woman	14	student	yes	no	porcelain painting, dancing	no
woman	45	secretary	yes	yes	reading, voluntary work (youth)	no
man	45	police inspector	yes	yes	literature, history, movies, sports	yes

The second family with older children lived in Oulu and consisted of mother and a 15-year-old son. Both of them were aware of information technology and use PCs in work and studies. The mother owned a mobile phone but did not use it very much. The boy intended to buy a mobile phone for himself. The boy makes web sites as a hobby. He uses a PC around 20 hours per week. The interview was held at their home.

Family # 4 (Oulu)						
Gender	Age	Profession	Has a GSM phone?	Regular computer use?	Hobbies	Has used a navigation device?
woman	46	secretary	yes	yes	sports, reading	no
man	15	student	no	yes	music, reading	no

2.2.3 Adult hobby groups

Football players

The group consisted of three young men aged between twenty-five and twenty-seven. Every interviewee was both a football fan and a lower division player. Their hobbies also included the cinema, making music and motor scootering. Every interviewee had owned a mobile phone for over four years and used a personal computer regularly at least five hours per week. Everyone used their computer for leisure and two out of three used it for working and for studying as well. One out of three knew beforehand what a navigator was but nobody owned one or had ever used such a device. The interview was organised at the Hypermedia Lab of the University of Tampere.

Football players (Tampere)						
Gender	Age	Profession	Has a GSM phone?	Regular computer use?	Hobbies	Has used a navigation device?
man	27	child camp director	yes	yes	football, playing music	no
man	27	merchant	yes	yes	music, football, scooters	no
man	25	student	yes	yes	football, movies	no

Boaters

The group of boat owners consisted of seven members of Lempäälä Yacht Club. Six of the participants were middle-aged men. The participants came from different walks of life but all shared a common interest in boating. Their boating activities were centred on the lake and river system around Lempäälä, but some also had experience of boating in sea conditions. Almost all of the participants had used a navigation device before, and two persons owned a navigation device. In addition, the members of this group had owned their mobile phones for much longer than those in the other selected groups. The discussion took place in a restaurant in Lempäälä. Two interviewers took part in the discussion.



Photo 1.Boaters in Villa Hakkari, Lempäälä

Boaters (Lempäälä)						
Gender	Age	Profession	Has GSM phone?	Regular computer use?	Hobbies	Has used a navigation device?
man	44	automation designer	yes	yes	boating	yes
man	55	fishing guide	yes	no	fishing, trekking	yes
man	47	doctor, CEO	yes	yes	boating, snow boarding	yes
woman	32	student	yes	yes	boating, downhill skiing	no
man	52	maintenance man	yes	yes	boating, downhill skiing	yes
man	46	kindergarten teacher	yes	no	boating, woodwork, motorcycling, old boats	yes
man	44	welder	yes	yes	boating, organisational activities	no

Hunters

Four middle-aged men participated in the scenario evaluation held in Kärsämäki. The common interests of the men were hunting and fishing. The men knew each other well beforehand. The environment in which the discussion was held was also familiar to the men. The session was held in the fire station's coffee room where these men occasionally come to chat and share experiences. All of the participants knew very well the VHF and GPS technology used to locate hunting dogs. One of the men owned Magellan's navigator and used it frequently. He had bought his first navigator in 1976. Two others had VHF radio transmitters on their

dogs. They had used technology to help locating dogs for around 20 years. Three of the men were considering buying a GPS navigator for themselves in near future.

Hunters (Kärsämäki)						
Gender	Age	Profession	Has a GSM phone?	Regular computer use?	Hobbies	Has used a navigation device?
man	44	carpenter	yes	no	hunting, fishing, trekking	yes
man	40	mail man	no	yes	hunting, fishing	yes
man	38	fireman	yes	no	hunting, fishing	yes
man	40	welder	yes	yes	hunting, sports	no

2.3.4 Youth groups

High school students in Kärsämäki

A teacher assembled the youth group in Kärsämäki from senior students of the town's high school. The students were all from the same class, and in this case the teacher was asked beforehand to have more girls than boys in the group. All of the students except one had a mobile phone of their own and all but one were regular computer-users.

Youth group (Kärsämäki)						
Gender	Age	Profession	Has a GSM phone?	Regular computer use?	Hobbies	Has used a navigation device?
woman	17	student	yes	no	bicycling, friends	no
woman	17	student	yes	yes	jogging, reading	yes
woman	17	student	no	yes	volley ball, reading, listening to music	no
man	17	student	yes	yes	skiing	no
man	17	student	yes	yes	computers	no

Youth at Walkers Café

The interview was carried out on a Friday night at Walkers Night Café in Lempäälä. This is a place where the local youth meet each other every weekend. The group of interviewees included seven boys aged between fifteen and sixteen. The group was chosen on a voluntary basis. All of the boys still lived with their parents and when asked said that their phone bills were mainly paid by their parents. Every interviewee had owned a mobile phone for at least two years. Every interviewee had some kind of a computer at home and half of them said that they used a computer regularly. Mostly the usage focused on studying and spare time activities. One interviewee said that he had used a navigation device before and, after getting familiar with the scenarios, every interviewee said that they knew what a navigator was.

Youth Group (Walkers Lempäälä)						
Gender	Age	Profession	Has a GSM phone?	Regular computer use?	Hobbies	Has used a navigation device?
man	15		yes	yes		no
man	15	student	yes	no	ice-hockey	no
man	15		yes	yes	badminton, moped	no
man	15		yes	yes	music	yes
man	16	student	yes	no	fishing, ice-hockey	no

2.3.5 Aged

The interviewed group consisted of active seniors living in the city of Tampere. All of the group members were working as volunteers in a service organisation for elderly people. Quite often they help elderly people who are dependent on others when going outside their homes, e.g. visiting in bank, post office or health care centre, etc. They knew each other well, so the conversation was relaxed. The interview took place at the Mummon Kammari in the city centre and took about an hour and a quarter. All of the interviewed people had a mobile phone of their own and all but one (a lady) had experience of computers. After the interview the navigation device was familiar to all, but, with the exception of one man, who had also used but not owned a navigator, none of them knew beforehand what a navigation device was.



Picture 2. Group discussion in Mummon kammari.

Active elders						
Gender	Age	Profession	Has a GSM phone?	Regular computer use?	Hobbies	Has used a navigation device?
man	64	economist	yes	yes	voluntary work, Lions Club	yes
woman	66	office manager (retired)	yes	yes	genealogy, gardening, voluntary work	no
man	60	pensioner	yes	yes	skiing, bicycling, childcare, voluntary work	no

woman	58	pensioner	yes	no	voluntary work	no
man	56	sgt.majot (ret.)	yes	yes	summer cottage, voluntary work, motorcycles, fishing	no

2.3.6 Disabled

The members of this group live in Tampere at a service house for disabled people. They all needed more or less help on a daily basis. Four members of this group used electric wheelchairs and one of the women was using a rollator to support her walking. Two of the men and one woman controlled their wheelchair with a joystick and two men with chin control. The group members had different medical diagnoses. All of the men were quadriplegics as a result of some injury or car accident. Their physical abilities were different from each other's. Two men were able to use their arms and some of their fingers, but the other two could not use their arms or fingers at all. The lady using the rollator had been handicapped since birth and the other lady had rheumatoid arthritis. Three of the group had been disabled for quite a long time, more than 20 years. Two had been disabled for only some years. Two of the men did not have mobile phones, but one of them had a computer. The lady using a wheelchair did not have a computer at home and she was not planning to have such a thing.

The interview was carried out in the office of the service house. It took about one and a half hours. The atmosphere was quite good since all of the group members realised that one of the interviewers had experience and knowledge of different kinds of disabilities. This was helpful because it was not necessary to tell the interviewers which kind accessibility problems they might have outside their own departments and using e.g., mobile phones. All had hobbies and one of them was a student at a university of technology. Since becoming handicapped, only one was in work.

Disabled group (Tampere)						
Gender	Age	Profession	Has a GSM phone?	Regular computer use?	Hobbies	Has used a navigation device?
woman	50	home mother	yes	yes	organisational activities	no
man	31	excavator driver	no	yes	computer	no
man	24	student	yes	yes	movies	no
man	44	pensioner	no	no	movies, music, outdoor activities	no
woman	50		yes		travelling, languages	yes

Visually impaired

This group was interviewed by two research scientists at the Tampere regional office of the Association for Vision Disabilities. The interview took about an hour and a half. Four of the participants had received the scenarios two days earlier and one of them just some time before the session began. This group consisted of five members, two of whom were women. They all lived in the city of Tampere. All of the members had problems with their vision. Two of the men were blind, and all the rest had some other kind of problems: poor vision, problems seeing in dark places. All of the group members had experience of using mobile phones. Their experience varied between one and six years. All but one had bought their phones themselves. One used a phone bought by his employer. Four of the group members used computers regularly and one now and then. Four members used computer at their work and also during their leisure time. They all mentioned that their disability could limit their use of a navigation device. The men said that they were familiar with navigation devices, but the women said that they were not.

Visually impaired (Tampere)						
Gender	Age	Profession	Has a GSM phone?	Regular computer use?	Hobbies	Has used a navigation device?
woman	40	secretary	yes	no	handicraft, reading (voice books)	no
man	33	translator	yes	yes	music, computer/internet, movies, literature, outdoor activities	no
man	32	storage worker	yes	yes	outdoor activities with a dog	yes
woman	27	textile artisan	yes	yes	bowling	
man	46	designer	yes	yes	outdoor activities, cooking, fishing	no

2.3.7 Students of well-being technology

Nine students of well-being technology were gathered in a lecture room on 22.2.2001. Two of the students first made a presentation about Technology and Ethics to the course and after this they presented the navigation scenarios to the others. Otherwise they did not take part in the discussion. The men in this group were older (8-15 years) than the women and had professional backgrounds. All of the students had mobile phones and frequently used a computer. As fourth-year students of well-being technology, they all had a pretty clear picture of the possibilities in using new technology in social and health care settings. That is why they were also asked to evaluate the scenarios especially focused on the elderly.

Students (Oulu)						
Gender	Age	Profession	Has a GSM phone?	Regular computer use?	Hobbies	Has used a navigation device?
woman	21	student	yes	yes	aerobic, gym, riding	
man	35	psychiatric nurse	yes	yes	sports	no
man	37	carpenter/student	yes	yes	hunting, fishing	yes
man	30	psych. nurse/student	yes	yes	sports	yes
woman	23	student	yes	yes	indoor banding, gym	no
woman	22	student	yes	yes	reading, outdoor activities	no
woman	22	student	yes	yes	indoor banding	

3 Results

3.1. User cultures in potential groups - attitudes, needs and innovations

3.1.1 Families 1

Family # 1

The family living in Oulu considered the scenarios credible in general but were pretty sceptical about using personal navigation themselves. Especially the mother had more a critical attitude towards the presented scenarios.¹

Tarzan

At first the mother would not except navigation systems for human use, only for finding animals or property. In this stage the daughter commented: "It would be too dog-like"². The father thought that personal navigation could be good for human use in strange places, in very big cities or in a forest. Also the mother now approved navigation in big cities, but she was still a little bit sceptical about using this kind of a system herself.³ She saw threats in using too many machines in everyday life, which is labelled here as **criticism of new technology**.

Twins

The mother thought that the system appeared pretty complicated. The father agreed that the system should be very easy to use. Presenting maps on a small display was also thought of as being pretty hard to use. The father thought that it would be almost impossible to use navigation system while driving, and he came up with the idea that the vehicle direction indicators could be activated automatically when using PNS in a car. If not driving the car, he saw that using navigation could be useful to him and paying for services with the phone could be reasonable. Both parents thought that if one were planning e.g. a trip beforehand or in the peace and quiet of a hotel room, it could be useful to get information and guidance to locations in this way.

Exhibition

The system presented in the scenario was not attractive to the parents. They thought that familiarising oneself with exhibitors and their material beforehand would be quite a big job. To ease this they came up with the idea of a search entry to the system; to define that you only want to know e.g. about countryside travelling at

¹ Haastattelija: Laite voi olla tällöinen (skenaariossa esitetty matkapuhelin) tai sitten se voi olla hajautettu järjestelmä. (käytiin läpi Navi -ohjelman esitteessä kuvattua järjestelmää)... sitten se voi olla aivan muunlainen vielä?

Äiti: En tiiä minusta tuntuu että se menis vähän liian robottimaiseksi se elämä jos sitä sillä tavalla suunnistais?

² Tytär: Se ois liian koiramaista.

³ Äiti: Niin, kyllähän sillä voisi olla hyvätkin puolensa. Tämmösessä tapauksessa, että on jossakin New Yorkissa, joka on niin suuri kun on, niin tuota. Mutta, kyllä sillä varmaan sitten huonotkin puolensa on...ettei sitä aina tarvii...

Isä: Tai metsässä, kun on marjassa.

Äiti: Niin semmosessa paikassa tietenk...jossa voi eksyä. Mutta tuntus vaan että kun ihmisiä ollaan, niin aina voi kysyä ja tuota..

the exhibition. They said that people usually go to exhibitions to wander around anyhow. They thought that PNS could be useful for professional people at very large exhibitions.

Levi

The father liked some aspects of the scenario. He emphasised safety. The mother was sceptical about locating other people even in this situation and would not let anyone locate her. She said that it could cause divorces and it would not be good to know all the time where one's spouse was.⁴ The father would let other family members locate him and said that if you don't want anyone to locate you, you can always turn the device off. Later on, the mother approved of positioning (locating someone) in some cases, e.g., wandering in Lapland. She would pay for this kind of services or rent out a device for FIM 50 (EUR 10) per day. The man would pay FIM 10 (EUR 1,5) in this situation.

The 'I Meet You' service was at first seen unlike in the scenario. A person could avoid e.g. work mates or someone that he or she did not want to meet at that time. The mother could see very social people using it and the father said that juveniles could be a potential user group for this service. The woman also came up with the idea that groups could use it to meet other groups, e.g. a school class on an excursion ('We Meet You' service). The father suspected that this could also be a new way for sex-businesses or sexual marketing to operate.

Junk Mail

The mother would not let an employer locate her or any employee. Later she could conceive of it being used in some mobile jobs. The man accepted the locating of people in some jobs. He mentioned guards and taxi-drivers. They both accepted the locating of merchandise or properties. The father thought that it would be nice to have commercial information if one wanted, and he saw it very helpful, for example, when looking for cheap hotels.⁵ Specifying terms to make a search entry was seen as vital to these services. The mother was against ads and criticised the whole system. The man also came up with the idea that the system could work out the service station selling the cheapest gasoline (how far is the station and optimal route).

After going through the scenarios there was more general discussion about PNS.

Usability

Father: Could not be used while driving.

Mother: If it were like a basic mobile phone, it would be easy to use.

Both: Doubts about fitting the map to the display.

Necessity - Potential first users

Not necessary for the mother. Father: Not completely unnecessary, but not needed in familiar places.

First user groups: Business people, juveniles.

Locating people: acceptable for forgetful persons e.g. the elderly, people who can do harm to themselves. The mother did not accept the locating of children. The father did accept the locating of small children (1-5 years)

⁴ Äiti: Mulla tuli vain, kun ensin semmonen, kun tämän luki ensimmäisenä niin, että on liiottelua tämmönen . Että pitäis aina tietää missä toiset on. Että sehän on avioerojen, kaiken maailman alku sitten kun on ...toinen voi koko ajan kytätä missä on.

⁵ Isä :Tämähän edistäs tätä markkinoiden täydellisen kilpailun ehtojen toteutumista kansantaloudessa. Siinä yksi ehto täytyis eli täydellinen informaatio. Eli kysyntä ohjautuisi sinne sen mukaan, preferenssien mukaan, eikä satunnaisesti ostettas kalliimpaa kun vierestä sais samanlaisen halvemmalla.

Price: They preferred usage charges (charging according to the amount of use) but if a standing monthly charge were levied, then FIM 100 (EUR 17) would be acceptable. They preferred an integrated model - phone and navigation service in the same device. They would acquire this kind of equipment if their old phone broke.

Family # 2

The best scenarios according to the family living in Tuusula were Tarzan and Levi. They could see themselves as potential users of this kind of services. Junk mail was seen as a problem case, but good for innovating solutions for the problems illustrated in the scenario. The father did not like the Exhibition scenario.

Junk mail

The father first viewed the locating of persons and especially employees very negatively. He emphasised the importance of trust between the employer and the employee. The mother presented as a solution that one could define the persons or groups allowed to locate you. The father, however, could see some jobs where localisation might be acceptable. He mentioned firemen and installation workers (mobile work) as examples. Guidance to routes was regarded as necessary in unfamiliar places. PNS was seen as being more usable on a mobile phone than as a distributed system. In some environments and situations, however, a distributed system was seen as a good solution for PNS (e.g., dark environment). Ads and marketing via the phone were seen as being usable if one could define exactly the search entries for the desired merchandise.

Levi

The functional models presented in the scenario were regarded as being acceptable also in other environments. The parents said that it would be a very good precaution because sometimes, no matter how well you look after children, they may get lost. On the negative side, however, they thought that it might result in kids being left too much on their own. Locating teenagers was acceptable if the juveniles themselves were in agreement. In the case of increasing the feeling of security, PNS was thought to be practicable in places where the possibility of getting lost is higher than normal (wilderness, skiing, extreme sports). Also locating sick persons (e.g. Alzheimer disease) was considered acceptable.

The 'I Meet You' service did not get undivided acceptance. It appeared to be funny but the purpose or a potential group using it was not absolutely clear. Also at this stage the question of localisation by authorities was raised. This sparked a discussion about legal issues concerning phone calls and PNS: both agreed that it should be absolutely certain that neither the authorities nor anyone else should be able to locate without their permission.

Exhibition

The father did not like the scenario at all.⁶ The mother could see some ways to increase attendance at exhibitions. Both liked the idea of indoor guidance in some other places. Business Card (and PNS in general) was considered usable at work.⁷ Businessmen, entrepreneurs and workers exposed to some kind of danger were seen as the first potential users for PNS.

⁶Isä: Mun mielestä tää on vähän ontuva, jos mennään feistufeis bisnestä hoitamaan, niin sitten siellä on jotkut koneet tervetuloo toivottamassa ja jää aika nihkeä maku tuosta. En mä tiää joku voi tietysti olla innoissaan tuosta, mutta henkilökohtaisesti...

⁷ Isä: Niin, mut ihan tossakin miten mä oon tehny asiakashankintaa. Mähän en nyt paljasta sitä, mut tavallaanhan mä oon vähän ton suuntaisesti tehny sitä eli mä oon valinnu. Yritystelen nettiversion perusteella pystyy hyvin tarkasti tekee hakuja. Sanotaan et se on sama idea. Tuo on vaan pitemmälle viety. Siinäkin niinku missä se on. Siinä säästää aikaa aika huikeesti, koska mä edellisessä työpaikassani soittelin puhelinluettelosta aakkosjärjestyksessä läpi. Ja sitten mä sovin tapaamiset silleen, ett yks oli itähelsingissä, toinen oli espoossa ja näin ja näin. Nyt mä tein semmosen diilin, et mä otin tosta asiakkaat ja kävin siellä tapaamassa. Se oli tuottosaa. Siinä pystyy hyödyntää.

Twins

The scenario was seen as an almost perfect example how PNS could help people to move around in cities. The mother, who had problems with her sight, considered PNS to be very necessary for people who travel by bus. The father thought that it could be easier to find special services with this kind of system (food, accessible buses and restaurants, and so on). The mother considered a distributed system very usable for people with poor eyesight.

General discussion

The family considered locating animals acceptable.

Costs

Price of device: father FIM 1500, mother FIM 2500 - 3000 (400 - 500 EUR). Both preferred PNS to be integrated into a phone. Usage charge or monthly charge depending on regularity of use.⁸ Monthly payment: father FIM 130 – 600 (20 -100 EUR), mother approximately FIM 200 (30 EUR).

The mother could not accept localisation without permission for anybody, not even prisoners or children. Marking property was acceptable to both.

3.1.2 Families 2

Family # 3

The whole family (father, mother, and daughter) found the scenarios and PNS believable but maybe not desirable for their own use. Control and monitoring was considered bad (father) and the locating of family members was viewed as being undesirable. However, the father and the mother came up with the idea of using localisation to pinpoint prisoners in open prisons. Navigation systems were familiar to parents because of their work. They knew that the system could help people in their work, but still they thought that workers would not want to be located occasionally.

The usability of PNS's display was considered problematic for map use (mother). Individual differences in the ability to read maps were seen as a challenge to designers.

Levi

The mother did not see the idea very practical because in the scenario the group was skiing in the same area. Localisation could be acceptable, however, with small children in some situations, e.g. lost in a supermarket.⁹ Also in the case of emergencies, localisation was seen as being good. The father could see a potential use for group navigation systems in big cities.

⁸ Haastattelija: No mitä se palvelu sais sitten maksaa ja miten se laskutettas? Onk se kuukausmaksu vai aina käyttökertakohtanen vai?

Isä: Sepä onkin mielenkiintonen. Kai sen pitäis määräytyy sen mukaan miten halutaan. Et jos sitä ei käytä säännöllisesti niin sit käyttökerran mukaan. Jos käyttää säännöllisesti niin kuukausmaksu.

Äiti: Mun mielestä kuukausmaksu ois yksinkertsempi. Et semmonen monitasone maksusysteemi, et sä voi valita tietyt palvelut mitä käytät ja sit kuukausmaksu nousee sitä mukaa montako palvelua on käytössä. Jos halua pelkäästään kartan ,nii se on halvempi, kun kaikki tämmöset mahdolliset palvelut.

⁹ Äiti: Mä en varmaan semmosta kyllä käyttäis, koska kuitenkin on kysymys niinkun siis samalla alueella olemisesta. Niin ei siihen siis sillä tavalla välttämättä tarvetta oo, että täytyy olla pieniä ja tuskin semmosia pieniä sitten yksistään. Siis tietysti jos on tosi pieni ja siis tää eksymisvaara, että lähtee omille teillensä. Siis siihen tämmönen laite on tottakai

The 'I Meet You' service was considered fairly practical in some situations. The possibility that somebody could use it to pester someone else was viewed as a problem.

The reliability (batteries, range) of PNS was questioned.

Exhibition

The parents saw the scenario as a horror scenario. The aim of ultimate effectiveness was seen as bad in itself.¹⁰ They thought that it should be a very flexible system, so that you could very easily change your plans and revise your guidance at exhibition. The daughter saw the reminder in the scenario as an acceptable function, but she also criticised the feeling of haste in the scenario. Business card was in some situations seen as a practical idea (father): to find people with the same interests e.g. in book exhibitions. Indoor navigation / route guidance was considered usable in very big exhibitions or museums as a means of getting information and planning a suitable route for oneself.

Rita and Boys

The locating of children was considered quite problematic. The mother could accept the locating of children when they are going to an unsafe area. However, the opportunities to cheat the system was commented on. The daughter could accept the locating of small children, but she thought that old children would find it oppressive. The father also accepted the locating of small children who are too young to think for themselves. Demented persons were also thought to be a potential group for the use of a transmitter to locate them when they get lost. Microchips were seen in the future for PNSs, but this was not commented on very enthusiastically.¹¹ Locating belongings was considered acceptable.

kauheen hyvä. Iso tavaratalokin saattaa olla tommoselle 3-4 -vuotiaalle taaperolle aika paha paikka. Ja siinä on muutamia paniikkitilanteita omienkin lapsien kanssa ollu, vaikka kuinka olis tarkkaavainen. Ja mä oon aina ollu kauheen tarkkaavainen, että mä en niitä juurikaan oo tiettyä metrimäärää pitemmälle päästäny. Mutta on muutaman kerran ollu, että ne on häipynyt. Niin kyllähän se kauheen kiva olis, että vois pistää jonkun säteen ja se rupeis piippaan jossain. Mutta tässä esimerkkitapauksessa mä en tiedä, että olisko se tota kovinkaan tarpeellinen.

¹⁰ Isä: Tässä tää toiseks viimesen sivun kuva, tää on niinkun tällanen kauhuskenaario, että tästä navigaattorista tuleekin rengin sijasta isäntä. Ihminen joutuu juokseen siellä pitkin niinkun tää ohjelma määrää, että nyt sun pitäis olla jo tuolla ja.

Äiti: Ja kyllähän se jossain vaiheessa, kun nää tämmöset kalenterit tuli, niin sehän oli niinkun hienoo, että oli kalenteri täys ohjelmaa, siis suunniteltu kaikki asiat eteenpäin. Ja sit yhtäkkiä se olikin niinpäin, että mitä korkeammalla hierarkiatasolla sä oot, niin sitä suuremmalla todennäköisyydellä sillä ei ole edes kalenteria, eikä sillä ole edes kelloa. Eli niinpäin se kävikin sitten, että ne ihmiset, jotka oikeesti oli sen kalenterinsa kanssa naimisissa, niin se rupeis kahlitseen niin paljon, että se huomasi, että enhän mä olekaan iso johtaja. Jossain, mä en muista, siitä on jo aikaa, kun nää ns. suuret johtajat heitti kalenterit pois ja ei kelloa ja sihteerit on sitä varten, että ne ilmoittaa, kun pitää mennä. Kuitenkin sitten, kun sihteerit ilmoittaa, niin sille ihmiselle itselleen jää se, että ei kun ilmoita, että mä tuun myöhässä. Että kyllä mä en tykkää kalenterin kanssa toimimisesta. Se on rasittavaa. Ja sitten tietysti sen huomaa siitä, että kun sen kanssa toimii, niin aina on jostain myöhässä. Kun on totuttanutun jo vähän siihen, että on pikkusen löysempää.

¹¹ Tytär: Toi on ihan hyvä, jos on jotain pienempiä lapsia ja ne vaikka tulee jostain koulusta, niin kyllä varmaan äiti haluaa varmistaa, että se pääsee kotiin, mutta en mä ainakaan enää oman ikäsenä haluais, että äiti koko ajan tietää, että missä mä oon. Vaikka nyt ei tekiskään mitään semmosta tai olis missään semmosessa missä ei sais olla. Mutta en mä silti tykkäis, että se koko ajan tietäs, missä mä olisin ja vois vahtia tavallaan.

Äiti: Niin, eikä se kuitenkaan mitään oikeeta vahtimista olis. Se olis tämmönen, siis tosiaan vaan niinkun syykkinen semmonen olo, että mua vahditaan. Kuitenkaan vaikka mä tietäsin että missä se on, niin enhän mä sitä tiedä mitä se siellä tekee. Ja se, että se on taas ihmisen omasta mielikuvituksesta kiinni, että se äiti rupee kuvitteleen, että kun se on tolla seudulla, niin mitä se siellä voi tehdä. Että se saattaa johtaa tosi hankaliin ristiriitoihin siinä ihmissuhteessa.

Isä: Niin ja kun tää näyttää vaan sen, että missä se laite on, joka lähettää.

Haastattelija: Niin, se laite voi olla kellä tahansa. Tai pudonnut tai.

Äiti: Tai varastettu.

Isä: Tämmönen voi tulla niinkun niin nuorelle lapselle kysymykseen, jolla ei vielä mitään omaa tahtoa ole.

Äiti: Ja voi olla, että semmosessakin tilanteessa, että me ollaan oltu kaupungilla tai...

Isä: Tai sitten ihan vanha, joku dementikko.

Junk mail

This scenario was considered bad if the person cannot restrict the service. Seeking curiosities/specialities was seen as a possible practical function for PNS. Locating employees was considered quite problematic.

General Discussion

The family would favour usage charges.

Usability was seen as a challenge.

Personal favourites: Reminder (daughter), atlas (father).

First users: indiscriminate (mother), people attracted to technology and people who use it at work (father).

Terminology of PNS was commented ambiguous.

Abuse of system - sex business, crackers (mother) was commented as a possible functional model for some groups .

Ethical evaluation was seen very important in PNS.

Family # 4

In the mothers' opinion the most credible scenario was Levi and the son said that the most believable scenario was Rita and boys. However, he would not let his own mother locate him and the mother would not even want to do it. The mother could accept the locating of around 6 -12 years old children. She commented that the smallest ones you could not leave alone anyhow. The son accepted the locating of small children and under-15-year-olds on some occasions.

Exhibition

PNS was not thought to be very usable in exhibitions, because exhibitions are laid out with circulation in mind (son). The mother regarded the scenario as being pretty complicated. She saw it suitable for very busy guests. The user-friendliness of PNS was also commented on at this stage. The system presented in the scenarios seemed easy to use, but the mother had doubts about what it would be like in real life. The son commented that for his mother it should be fairly easy to use.¹²

Levi

The 'I Meet You' service did not find favour either.¹³ The mother did like the presented group-navigation service, especially in special situations and unfamiliar environments. The boy commented that parents spy on their children too much.

¹² Poika: Niin. Se riippuu vähän että miten montaa nappulaa pitää painaa. Äiti kun ei ossaa tekstiviestiä lähettää niin...aika helppokäyttönen sais olla.

Haastattelija: Laitaks sie äitin puolesta sitten tekstiviestit?

Poika: Joo. Alakuaikoina ei osannu ainakaan laittaa. Kyllä se nyt saa kirjaimet sinne.

Haastattelija: Joo.

Äiti: Kyllä se käytännössä pitäis olla kyllä semmonen, ainakin meikäläiselle semmonen teknisesti hyvin yksinkertainen että sitä viittis käyttää.

¹³ Poika: No. Tää on nyt tämmöstä teknistä höpinää, että kyllä se on parasta tutustua ihmiseen ihan ihmisenä. Sattumalta, ettei tommoset jutut paljon kerro ihmisestä. Loppujen lopuksi.

Junk mail

Both commented that ads would be good if one could select the kind of ads one wants. Locating employees was a complicated issue and at first pretty hard to accept.¹⁴ Route guidance was regarded as being usable in bigger cities than Oulu and in unfamiliar places.

General discussion

PNS good for finding e.g. demented persons.

No need for PNS (son). The mother could use it in woods and unfamiliar cities.

Price: Both preferred charges based on usage.¹⁵ The equipment should not be more expensive than mobile phones (son).

First users: Families with children and elderly minders (son). The elderly and special groups like hunters using dog-radio-transmitters (mother).

3.1.3 Adult hobby groups**Football players***Pub*

The interviewees found locating friends very contradictory. One of the group said that locating hobby-based communities (football team, rock band) would be useful, while another man was not interested in the service

Äiti: Kyllä tuo tuntu minusta aika silleen. Vieraalata ajatukselta tuntu, että että tuota.. tuskinpa tulis ikinä käytettyä.

¹⁴Haastattelija: Entä sitten tämä työnantajan lupa paikantaa työntekijä? Onko hyväksyttävää vai minkälaisia kommentteja siitä?

Poika: No se riippuu työsopimuksesta. Jos työntekijä haluaa, että sillä on mahdollisuus paikantaa niin sillonhan se on. Se on nyt. Onks se nyt sallittua, että työnantaja tarkkailee työntekijänsä sähköpostia. Että se on vähän sama juttu.

Haastattelija: Ei se taia olla sallittua?

Poika: Niin. Kyllä ihmisellä joku yksityisyys pitää olla. Jos vessaan menis, niin työnantaja kattos, että siellä se taas norkoilee.

Haastattelija: Niin.

Äiti: Kyllä tämä vähän semmonen kakspiippunen juttu on, että tuota. Se saattas tuota. Minä en nyt oikein ossoo tuota sanoo, että mikä ois semmonen työ, misä se ois ihan paikallaan, mutta tuota, mutta mutta. On tämä kyllä vähän semmonen, että siinä ja sinä rajoilla hyväksysinkö tämmöstä ite henkilökohtaisesti.

Haastattelija: Niin. Jos ajatellaan että työnantaja, sillon kun menee uuteen työhön, että tästä saat navigointilaitteen ja sun pitää pitää sitä työaikana päällä sitten sitä paikantamisjuttua, niin miten siihen suhtautuu?

Poika: No voiko työnantaja pakottaa sitten semmoseen?

Äiti: Mut jos se ois ehto sen työpaikan saamiseen, niin kyllä kai jos periaatteessa työaikana, niin, työaikaanahan sitä ollaan kuitenkin niin työnantajan palveluksessa, niin...

Poika: Jos työsopimuksessa määritellään, että pittää tehdä työ niin sitä vasten saa palakan. Jos työpaikalta lähtee huitelemaan jonnekin, niin eihän se oo sallittua. niin siinä mielessä.

Äiti: Kyllä varmaan ainakin henkilökohtaisesti niinku hyväksysin semmosen jos sitä siinä vaiheessa kun työsopimusta tehään niin sovittas niin mikäpä siinä.

Haastattelija: Siinä tilanteessahan sitä ollaan vaan, että aika heleposti hyväksyy monia asioista.

Äiti: Niin, mutta periaatteessa jos aattelee, että työaikaan sun pittää olla työnantajan käytettävissä joka tapauksessa, niin eikai sitä sitten omille teille ylleensäkkään lähetä työaikaan. Tai jos jotakin ommaa asiaa on, niin siitä sitten ilmoitetaan.

¹⁵ Poika: Se tulis niinku kännykän liittymään. Se ois semmonen lisäpalvelu jos mahdollista. Ei mittään ylimääräistä kuukausimaksua. Käytön mukkaan mahdollisimman halapa.

at all.¹⁶ The group also discussed the social pressure that could develop: how could you be sure that some day it would no longer be possible to turn your device off. This kind of behaviour was compared to the culture currently dominating mobile phone usage.¹⁷

Exhibition

The interviewees all had quite similar opinions on the exhibition scenario. The service described in the story was considered suitable and useful for particular groups (especially businessmen) but maybe not for larger groups.¹⁸

Party

The route guidance was thought to be quite useful but the dating and social matching services were considered ridiculous and unnecessary.¹⁹ One participant thought that it might be very irritating if everyone, especially parents, could find you in the middle of a house party.

Junk mail

The group discussed experiences with the e-mail-based junk mail for a while, and found it troublesome that the personal mobile device might also carry this kind of feature. On the other hand, filtering services were found interesting. Also location-based information about contemporary events was found useful.²⁰

Levi

Positioning within the family was accepted for the safety of children, but some negative perspectives were also presented. The importance of clear agreement inside the family was stated.²¹

¹⁶ Mies 1: Mä sanoisin, että mä haluaisin paikantaa esimerkiksi futsijoukkueen, tota ja sit haluaisin paikantaa niinkun bändin ja mikä olis semmonen, nää harrasteyhteisöt ja tämmöset ja ehkä työporukankin tietyissä jutuissa, mutta siinä taas tulee se, että ne ei varmasti halua että mää paikannan heidät vaan.

Haastattelija: Antaisiks sää sitten näiden kaikkien paikantaa sut?

Mies 1: Sepä siinä, antasinko vai en, ehkä tiettyyn kellonaikaan, mutta en mä tiedä.

Mies 2: Mää ainakin sanon, että niinku jos olis rajoittamaton oikeus paikantaa, niin en antais kellekään sitä oikeutta, tuntuu jotenkin hurjalta.

¹⁷ Mies 1: Tässä on ihan sama se, kun mulla on niinkun työn puolesta puhelin ja niinkun tavallaan se rooli on koko ajan päällä, siitä, että jos mä nään, että joku tietty tyyppi soittaa, mää joudun tiettyssä roolissa vastaamaan ja oltava, se on just se sama niinkun jo kännykän kanssa sillai, että ei aina välttämättä jaksais, mutta aina täytyy. Melkein vaikka ei täytyiskään, niin silti. Siitä huolimatta. Velvollisuus ja työetiikka, mikä siellä puskee. Itsekehun puolelle menee.

¹⁸ Mies 1: Mutta niinkun mä tässä messuvieraassa tulee selvemmin esiin se, että on tiettyjä ryhmiä, joille se tosissaan on niinkun hyödyllinen, mutta niinkun sitte koko kansalle ni.

Haastattelija: Mitkä ne ryhmät sitte olis, jolle se olis hyödyllinen ?

Mies 1: No jos nyt ajatellaan tästä messun kuvastakin niin menestyvät liikemiehet, jotka nyt tarvitsee siis tai työnsä puolesta, miten sen nyt selittäis sitten.

Mies 3: Kaikille, joilla aikataulut on tiukoilla.

Mies 2: Mää vähän epäilen, että ne ei silti niitten aikatauluja helpota, ne kyllä on entistä tehokkaampia mutta yhtä kiireisiä sitten.

¹⁹ Mies 2: Mutta niinkun, loppuosassa missä on tähän niinkun, niinkun sosiaaliseen kanssakäymiseen, niin mä nään nää aika turhaks, niinkun että, luonnon valinta, ei ei tämmöstä.

²⁰ No, esimerkiksi jos tilanne menee siihen, että tota niin paljon on sitä informaatiota ja joku tämmönen laite on konkreettisesti käytössä, niin kyllähän se sillon tommonen on ihan ehdoton palvelu. Tai toisaalta justinsa, että jos on ite jossakin vaikka bändit kaupungissa linkissä, niin tietää, että nyt on keikalla joku uus.

²¹ Mies 1: Että jos ne nuoret nyt on jossain siellä mäessä sen näkösesti, että nyt ne menee tuolla mäkee turvallisesti alas, niin kyllä vanhemmat voi olla tosiaan niin turvallisn mielin, eikä ne oo missään niinkun mettässä makaa puuhun törmänneenä niin, ihan hyvä mutta.

Mies 1: Niin ei kai se sillo jos se perustuu yhteiseen sopimukseen, se että jos niinkun se on tasapuoliset sopimuskumppanit, niinkun että miten tätä käytetään ja millon, kai se sillon toimii. Mutta en nyt sitten tiedä, joku lapsi

General Discussion

One interviewee repeated many times that he didn't like the idea of creating social relations with the aid of a personal navigator.²² The world shaped by the navigation services described in the scenarios was considered very rational and purpose-oriented.²³ Although some of the services were thought to be unnecessary and silly, the group still shared the opinion that these kind of services will become a reality in the near future.

Boaters

One of the participants commented that all of the scenarios were unbelievable. Sailing was considered an usable scenario. Problems associated with the usability of small displays were brought up. The real need in sailing for PNS was in big lakes or at sea. Persons who had experience of GPS navigators commented that it is very useful in some situations (dark, low water, strange and big waters and fog), but the reliability of new technology was called into question (e.g. flat batteries). Professional users of PNS in boating were seen as an existing user group with even greater potential in the future.

Doubts about updating the system were also expressed. Basic knowledge of traditional navigation techniques was considered very necessary. New technology was said to be just one addition to the equipment that is already used in navigation.²⁴

Locating people brought up many questions. Opinions were divided and the situational need for localisation was commented on (localisation was accepted in the case of presumed danger). Some were opposed to the idea of themselves being located and said it drew a parallel to the spectre of "Big Brother" is watching. Some accepted the locating of small children, but others saw it as unnecessary.²⁵ Locating elderly people was accepted if either they themselves consented to it or they were under guardianship because of illness.

Animal localisation was accepted in general, but for own use it was considered unnecessary.

The locating of property (e.g. boats) was accepted.

Exhibition

ja aikuinen -homma, että kuinka paljon siinä joku lapsi pääsee vaikuttaan. 15-vuotias tytär on mennyt sen Pekan luo, haetaan pois se. Ne on siellä makuuhuoneessa, pisteet on ihan päällekkäin. Että sillä viisiin. Siihen se menis.

Mies 2: Ja sitten kun vielä kaveritkin sitä seurais.

Mies 3: Kaikki koulussa leuhkiminen loppuis siihen, kun kaikki tietäis, että ei mitään voinut olla.

²² Mies 2: No, mun mielestä se on siis utopistista tai ei utopistinen vaan niinkun tyhmää, siis just se että ihmisten henkilökohtainen kanssakäyminen toimii näitten koneiden ehdolla, että sitä mää pidän vähän niinkun.

Mies 2 (myöhemmin): Eiks se kanssakäyminen tai se, että niitä ihmissuhteita tän perusteella vaan voitais niinkun rakentaa niin tai ei pelkästään, kun tätä mitenkään avuks käyttää, niin se tuntuu mun mielestä kyllä ihan, aivan älytön ajatus.

²³ Haastattelija: Onks nyt vielä jotain, jotain mitä näistä niinkun jääny hampaankoloon tai miltä näyttäis se maailma, jos nää olis käytössä ?

Mies 2: Hemmetin päämäärätietoiselta mulle tuli ainakin ekana mieleen, kaikki niinku tai tästä saa vähän semmosen kuvan, että kaikki on koko ajan hallussa, tiedetään koko ajan missä mennään ja mitä on tarjolla.

Mies 1: Se olis länsimaisen yhteiskunnan huipentuma.

Mies 2: Niin just, että se olis se kliimaksi. Että ei enää minkään tyyppistä sekoilua.

²⁴ Veneilijä 1: Mitään vanhaa vehjettä ei voi jättää veneestä pois tän takia, että tää ei korvaa mitään, tää on vaan yks vehje lisää, täytyy olla se kartta, valoheitin ja kompassi edelleenkin.

²⁵ Veneilijä 2: Kyllä se melkein on sillain, jos ne on sen ikäisiä, että täytyy tietää missä ne on, niin sitä on itse niin lähellä, että sen näkee ja sitten jos ne on niin tota, on niin kaukana, että niitä ei nää niin sitten niitten täytyy olla sen ikäisiä, että sitten niihin voi luottaa, että.

Veneilijä 3: Siinä vaiheessa ne ymmärtää pistää sen paikantimen kiinni

The scenario was not thought to be useful in small exhibitions. Neither was it seen as being usable for professional use. The usability of the system was again brought up. The system was thought to be so complicated that one might use only some of the most needed and easiest functions of PNS. The business card was considered a rather odd application, but first users for it were thought to be found in juvenile groups.

The ability to use PNS occasionally in special situations was brought up. Big cities and strange places were mentioned as potential places to use PNS. Real advantages were seen in using professional navigation systems in taking care of business. For this group the real need and cost of the service were seen as critical limiting factors to the use of PNS.²⁶

The group members came up with the idea of using PNS to find parking lots and detours.

Junk mail

The idea of local ads and services was considered useful, but one of the participants would still prefer personal phone calls to some services on the move, e.g. hotel reservations (safety in car, easy to use). Localisation information was seen as being important for breakdown and emergency services to save time and avoid misunderstandings. Using extra devices while driving a car was commented on negatively and positively alike.²⁷ The locating of employees was accepted in certain jobs, e.g. rescue, emergency, transportation and security services.

Usage charges of around FIM 2 – 20 (0,25 - 6 EUR), depending on the purpose and duration of use, were preferred to a standing monthly charge.

The group thought that potential first users could be found in professional and juvenile groups.

Hunters

The man who owned a navigator first told about his own experiences of navigators, place marking and so on. In his opinion the equipment was very useful in remote and strange places. He could see a few problems in the usability of the navigator. Also the absence of a Finnish manual was commented on.²⁸ Integrated PNS was commented on negatively. Separate equipment for different purposes was considered better.²⁹

²⁶ Veneilijä 4: Mut kyllä siis, toisaalta kun ajattelee kokonaisuutena, niin jos se on helppoo ja se on halpaa ja se tulee vähän niinkun ilman sen isompia erityisponnisteluja, niin kyllä sitä varmaan käyttäis sillon tällön. Esim. mä käytän kännykästä säätiedotusta aina sillon tällön, kun mä haluan säätiedotuksen tasan nyt. Et mimmonen ilma täällä on huomenna. Mä näpytän sen tonne kännykkään ja se tulee sekunnissa.

²⁷ Mies 1: Kyllä sitä nyt yhtä kännykkäänkin pystyy käyttään (autolla ajaessa).

Mies 2: Jos se on riittävän selkee vaan se käyttöliittymä sitten, että siitä just näkee sen napin mitä siinä täytyy sitten painaa.

Mies 3: Mutta kyllä tänä päivänä puhutaan jatkuvasti enempi siitä, että näitä on aika paljon näitä ja nimenomaan näitä mystisiä kolareita olis täämösiä kännykänkäyttökolareita, että aikasemmin puhuttiin aina että se on aina itsemurha, kun suora tie ja rekka tulee vastaan tai toinen auto tulee vastaan ja sä pläjäytät siihen. Mutta tänä päivänä on ainakin tossa Tekniikan Maailmassakin, monesta on puhuttu semmosia, että on tekstiviestiä pantu tai ihan vaikka vaan puhelimesta oltu. Että on tässä itekin syllistynyt semmoseen tilanteisiin, hyvä säkä kun ei oo käyny mitään.

Mies 1: Siinä on hyvää aikaa kaikkee tehdä ja samalla ajaa.

Mies 2: Aika kuluu siivillä.

Mies 4: Tonne Karigasniemeenkin jolkottelee transitilla 17,5 tuntia, niin mulla oli huuliharppu ja soittelee huuliharppua, yksistään katon ajelin. Että mä oon täällä nyt. Kun yhtämittaa kun oli perunakuorma päällä Karigasniemeen ja pakkasta oli 25, niin sitä ei passannu topan sen kanssa, muuten ne olis ollu valmiit. Yksistään lotkottelin sillä seittemää, kahdeksaakymppiä, tuhannen kiloo perunaa päällä, niin sitä niinkun koetti aina jotakin tekemistä keksiä. Korkeintaan viis minuuttia kävin ulkona happihyppelyllä ja sillonkin lämmittimet puhalsi täysillä koppiin.

²⁸ Haastattelija: Niin. No oliko helppokäyttönen, vai vaikea?

Metsästäjä 1: No kun ei opettele liikaa, niin kyllä se hyvä on. Opettee vaan sen, minkä siitä tarvittee. Eikä tartte ohjekirjoja...

Haastattelija: Siinäkin on toimintoja vaikka millä mitalla noissakin vehkeissä.

Using localisation technology in hunting was said to change the nature of the hunting dog. In the old days the dog tried to find the master. Nowadays the hunter seeks the dog.

Pub, Levi, Party

The functional mode presented in the scenarios was regarded as possible in strange cities. The locating of a group in strange places with a big group was also commented on positively. They had doubts about the usability of maps on small displays.

Exhibition

The scenario elicited mainly negative comments.³⁰

Junk mail

An employer may locate an employee only in cases of real need. Localisation was considered useful in many jobs (e.g. delivering things, transportation). Ads could be acceptable on some occasions.

General discussion

The locating of small children was accepted generally, but they doubted whether ordinary families could afford the required system. Persons suffering from memory disorders were mentioned as potential users of PNS.

A new project concerning the arrangement of trips for hunters had been launched in the municipality of Kärsämäki. PNS was thought to be useful tool for taking care of the travellers in the wilderness. However, it was pointed out that in the wilderness one should also know the more traditional methods of navigation. People and especially youngsters who purchase navigation devices and radio transmitters are still encouraged to learn how to cope in the wilderness without new technology.

Marking routes and interesting places with the aid of GPS navigators was thought to be very useful. New technology was mentioned as being abused by poachers.³¹

Metsästäjä1: Onhan niissä. Käyttöohjekirja sitten ja laitekin on mukana. Sitä on käytännössä suotta opiskella tuota kaikkea siitä, kun ei niitä tartte juuri kun ne tietyt. Ja sitten ne saa ohjekirjoista kun tarttee.

Haastattelija: Mitenkä hyödyllisenä oot kokenu tän vehkeen?

Metsästäjä1: No se on sillon kun sitä käytetään oudoilla mailla, missä ei oo koskaan liikkunu, niin se on kyllä peräti hyödyllinen. Esimerkkinä, kun käydään metsälläkin aamulenkki ja sovitaan kellonaika, että ollaan sillon takasin, niin se on koko ryhmä sillon takasi, eikä sitä tartte soitella eikä huudella.

²⁹ Metsästäjä 1: Mulla on semmonen käsitys noista, että niitä ei tavallinen ihminen tartte, kun se niin paljon harvon, että minä en laittas kapinetta. Niinkun tässäkin se on kertakäyttökampeita tavallaan, se on vuosi, kaks, kun sitä vaihdetaan, hävitetään, jos se menee rikki. Näiden käyttöikä on suhteellisen pitkä, kun näitä pidetään hyvin ja sitä käytetään tarpeeseen.

³⁰ Metsästäjä 1: Jos sulla on 10000 tuommosta ja jokainen töllöttää siihen, niin kukaan siellä messuilla ei näe mitään, ne kävelee. Ja miten sitten se, jos se on ohjelmoitu ja näkee jonkun hyvän kaverin ja menee pari kolme tuntia..

Metsästäjä 2: Kyllä sitä osaa vielä, ettei tartte, tän mukaan kun rupee kiertämään tulee väkinäistä.

³¹ Metsästäjä1: Ja mistä ne osaa siihen samaan kohtaan takasin, joka järvellä se on hukassa se paikka. Ite oon käyttäny x-järvellä, se on kokonaisuutena 30 km pitkä, vaikka on sitä selkee kymmenkunta kilometriä. Joskus kun on hyvä paikka löytyny, niin minä oon kirjottanu ahven tonne vaan ja pistäny muistiin, niin mä voin mennä kuukauden päästä uudestaan ja se vie juuri siihen.

Haastattelija: Ja kalaa nousee?

Metsästäjä 1: No se on sitten taas toinen asia, onko sillon siellä.

Metsästäjä 2: Noi karttakoordinaatit, kun vielä niitä oppis käyttään eri lailla.

Metsästäjä 1. Kaikkihan oppii käyttään jos vaan tuota sitä tarpeeksi tarvittee. Sehän oli asteina, niin metri...

Metsästäjä 3: Eikö ne salaa pidä verkkojakin, pistää vaan, ei tartte poijuja laittaa.

The group generally favoured charges based on usage. The use of PNS services could vary greatly over time, and they thought it would be irrational to pay for something you don't use.³²

A microchip-based transmitter, e.g. in a pocket, was mentioned as a future development.

The men themselves did not want to be located by their wives or family members when they are out.

The group referred to usability (easy to use) several times and to the potential use of PNS in the wilderness by travellers or local people as a precaution.

Manuals or instructions should be available also in the device itself.

3.1.4 Youth groups

Walkers – Lempäälä

The juvenile group from Lempäälä was one of the two groups that did not have an opportunity to familiarise themselves with the scenarios beforehand (the other one was the students of well-being technology in Oulu). In the group discussion the scenarios were first presented one by one and then there was general discussion.

Billiard

The scenario was considered to be believable. The ability to see where one's friends are was thought to be rather useful. According to the participants, it could save time and money if the service itself were affordable.³³

The group favoured a standing monthly charge for PNS services. They thought that charges based on usage could discourage the use of services.

Localisation should be restricted and under the user's control: the user decides who he will allow to locate him/her. The right of parents to locate their juvenile children was also commented on negatively.³⁴ Also, authorities like teachers and the police were mentioned as groups not permitted to locate the boys.

Comparing the prices of different local services was seen as an economising opportunity in the system.

The boys were ready to use this kind of system. Only the price of the services and the device were mentioned as limiting factors.

Emergencies were mentioned as situations where localisation would be extremely useful.

Personal navigation was mentioned also as a possible new game mode.³⁵

³² Metsästäjä 1: Ei siinä oo mitään järkeä viittäkymppiä maksaa kuukaudessa, jos mä viitenä päivänä tartten syksyllä Taivalkoskella lintumetällä tätä, enkä sittenkään poimi yhtään palvelua sieltä. Se on järjetön systeemi, kaikki kiinteät kuukausimaksut.

³³ Haastattelija: Lähinnä meillä oli ideana se, että olisko tällasesta käyttöä tällasessa tilanteessa? Et voisko sitä kuvitella, että todella kattos esim. jostain kartasta, että missä kaverit on menossa tai?

Nuori 1: Kyllä se parempi olis, kun joskus joutuu soitteleen kaikille, että missä sää oot ja missä sää oot, voiks sää tulla, jaa ei voi. Menee aina vähän hermo.

Nuori 2: Säästäis laskua, kännykkälaskua

³⁴ Haastattelija: No mitä esim. jos teidän äiti tai isä sanos, että jos mä maksan laskut niin kyllä mun täytyy saada paikantaakin. Mitäs te siitä ajattelisitte?

Nuori 1: Se jurppis vähän. Ja sitten jos lähtee johonkin, mitä ne ei saa tietää, niin pistää sen sillai, ettei äiti pysty näkeen, niin sitten se on ihan hermona ja taas tulee kylmyyttä kotona.

³⁵ Nuori 1: Mä mietin vaan, että mitäs noi pelit, voisko tolla pelata jotain? Elikä mitkä ne ominaisuudet on, että sen pystyy paikantamaan?

Party

The group considered the scenario to be believable.

Navigation services were said to be good if one gets lost or in outdoor pursuits.

Navigation services in bigger cities and in big groups were said to be practical.

The group members held differing opinions on the 'I Meet You' services (profiles). Some considered it quite useful and exciting, others said that it was mainly for very sociable people.³⁶

Junk mail

The ads presented in the scenario were accepted rather eagerly. The group thought it very important to be able to choose what information is given to the PNS user, when it is given, and who is giving it.

Route guidance was mentioned as being useful in unfamiliar areas, not in the user's hometown. There was some discussion about route guidance: useful information of the shortest possible route and the cheapest (bus, taxi or train).

The locating of small children and youths up to 15 years of age was accepted by the group. Youngsters made comparisons with mobile phones in this question. The group pointed out that parents can already reach their children by mobile phones if they are worried about them. However, they don't call all the time. It is just a precaution. Locating older juveniles was thought to be an unreasonable precaution, if parents could watch them without their knowing it.³⁷

Group navigation was regarded as one possible way to use PNS. One's own crowd, family members and maybe also other groups could be on the localisation list (maybe one at a time).

Exhibition

The exhibition scenario did not elicit any comments at first. At the end of the discussion the boys said that it was the most unhelpful scenario for them. Exhibitions that the boys had visited had not been so large that one would have had any difficulties in finding what interests oneself.

PNS was seen to be useful in strange and bigger places. Also social navigation, such as finding buddies, ads and guidance, was mentioned as the most useful aspect of PNS for them.

Senior high school students – Kärsämäki

In the beginning of the discussion Junk Mail was mentioned as the most believable scenario. One member of the group mentioned Exhibition as being the most useful for him. Another person had a very negative picture of that scenario. Party³⁸ and Billiard were also mentioned as unbelievable scenarios in some respects.

Party

Pystyis pelaan vähän niinkun verkossa kavereitten kanssa. Se olis kiva

³⁶ Nuori 1: Olis ihan kiva, ettei rupee ketään ihan toivotonta työstään.

Nuori 2: Että minkälainen tyyppi tällasta tekee, tota profiloitujuttua, se pitää olla sosiaalinen ihminen.

³⁷ Nuori 1: Äiti pystyy soittaa, muttei pysty näkeen. Se olis parempi. Ei se nyt koko aikaa siellä kyylää, mutta jos sille tulee huoli, niin sitten se voi soittaa.

³⁸ Nuori 1: Jos sää nyt meet jonnekin kotibileisiin, niin kyllä saa varmaan osat niinkun, sulla on silmät, osaat sää kattoo missä se toinen on eikä sun tarvi niinkun, no joo katonpa tuolta, että en niinkun ois, mulla ei oo yhtään sosiaalisia taitoja, et mun pitää kattoo navigointilaitteelta että missä ne kaverit on, etten osaa kysyä joltakin sitä.

Nuori 2: Sitten ei voi kysyä toista tanssimaan, mun pitää laittaa se navigointilaitteeseen pitää laittaa se, että pääsee tanssimaan.

Although the locating of persons at parties were commented on negatively, some other aspects of the scenario were seen as useful for some groups. Route guidance and timetables were mentioned as being useful for the visually impaired and persons coming out-of-town. The locating of people indoors was mentioned positively in certain situations, e.g. looking for someone in very large buildings or halls, when there is some urgency, or perhaps to help a shy person contact other people. Also the locating of children was mentioned in this connection as one possible opportunity.

Exhibition

The functional model presented in the scenario was seen as being useful in very big exhibitions or museums. Guided tour was commented on negatively, as it would somehow limit people in finding new alternatives.³⁹ The business card and the idea of profiles were commented on positively. It was thought that it could be useful in finding people with the same interests. Also the group found the idea of finding a date by profiles rather exciting.

Junk Mail

Location-based commercial services (ads) were commented on very positively. The locating of employee was not approved of on the whole. The group thought that employees should only be located in the case of very important and busy projects. Also, the legal aspects of push services and localisation were mentioned.

Social navigation was accepted with friends. The locating of small children and the elderly was also accepted. However, parents should not locate their children all the time. Again here, a comparison was made with the use of mobile phones: the control of parents had not really increased even though children can now be reached almost all the time.⁴⁰

Animal localisation was familiar to this group and it was accepted. In hunting (transmitters in moose) and e.g. in hiking, some participants also commented that the idea of these hobbies would change radically. Others considered PNS also in these cases just as a precaution.

The usability of PNS in the scenarios was considered practical. Some of the participants had doubts about maps and small displays.

Most of the participants would be willing to try PNS services if the price were not be too high. The opinions of the participants were divided when discussing the costs of PNS: charges based on usage or a standing monthly payment. They thought that the costs of the services should be under FIM 100 (15 EUR) per month and the usage charges under FIM 5 (1 EUR).

First potential users of PNSs were thought to be young and professionals like businessmen, police and persons in mobile work.

The locating of property was accepted in general.

The group hoped that the system would be small. For children the transmitter could be embedded in their clothing. Wristbands and microchips as transmitters were also mentioned.

³⁹ Nuori 1: Jos tosissaan olis aina tämmönen niinkun opastettu kierros, niin siinä sitten keskittyis vaan sitten koko ajan enemmän siihen niinkun mitä ite tykkää tai sillee, mutta ei niinkun sitä uutta sitten sais hirveen silleesti, omaa näkökenttäänsä avarrettua, jos aina vaan ottais ne mistä niinkun on kuullu ja mitkä on ennenkin kiinnostanut ja tälleen.

⁴⁰ Haastattelija: No, entäs vanhemmat, saisko ne paikantaa jossain tapauksessa?

Nuori 1: Ei ainakaan koko ajan.

Nuori 2: On niinkun puhuttu kännykästäkin, että juu, että kännykkä on semmonen, että vanhemmat niinkun silleen tietää, että missä lapset on liikkeellä, ei se silleen oo ollu semmonen, että ne nyt soittaa, että missä oot ja mitä teet, tuskin siitäkään sitten tulis semmonen.

Loss of social skills and probable loss of jobs were mentioned as threats from the general use of new technology in the everyday lives of people. The discussion led to criticism of modern technology. In the end one of the participants again compared PNSs to mobile phones.⁴¹

3.1.5 Aged

Technology was seen as a helper for people with poor eyesight or impaired hearing. Also people with memory disorders were mentioned as one potential user group for PNS. The group's first feelings about the scenarios were, however, mixed - even negative. Comments like "Big Brother is watching" and "put the device under your skin", were made.⁴² Life was said to be too technological nowadays. Poor usability and fear of very complicated systems were also mentioned. The reliability of the technology was also called into question. As most implausible scenarios, Afternoon dance and Exhibition were mentioned as going too far beyond the real needs of people.

Exhibition

The group members had differing opinions on the story presented in the Exhibition scenario. In the exhibition environment PNS was seen as useless and too technological. Indoor route guidance in very big markets were mentioned as an application. One in the group had experiences of automatic guidance in a submarine museum in America and her experience of that system was quite positive.⁴³

It was pointed out again that maybe there could be more important needs to fulfil than those presented in the scenarios. Attitudes towards new technology were thought to be more positive in younger groups than in a group of their age.

Afternoon dance

The scenario divided opinions in the group. Some considered it rather useful and some saw it as exciting. Finding places of interest with the aid of PNS was mentioned positively.

Several different options were presented in the discussion on price: Annual fee. If it (PNS) is really needed, one could pay more (quite a lot). The device could cost around FIM 1000 (150 EUR). Charging based on usage.

The group considered the distributed system visualised in NAVI brochure (display in glasses) to be rather futuristic.

⁴¹ Nuori 1: Sitten tuli tosta mieleen, että tekeekö se ihmisistä semmosia, että ne yksinään jossain on ja laite vaan kertoo kaikki kontaktit toisiin ihmisiin, niin taas sitä mitä kännyköissäkin puhuttiin aluksi noin, mutta kävikin päinvastoin, ihmisistä on tullut paljon sosiaalisempia, ne ottaa toisiin kontaktia, on paljon helpompi ottaa.

⁴² Haastateltava 1: Kuule, siinä vaiheessa on samalla lailla kun on sitten nää sydänakut tai laturit, niin on semmonen laite, joka pannaan sulle tohon nahan alle. Että sitten kun sä meet missä tahansa, niin sut voidaan signaalilla tunnistaa.
Haastateltava 2: Ja ihan turhaa on murehtia sitä, että isovelvi valvoo, koska se valvoo jo tällä hetkellä.

⁴³ Nainen 1: Mä oon tämmösen opastushomman tehny kerran. Mä olin pojan luona Kaliforniassa ja menin sitten siellä San Fransiscossa sukellusveneeseen niin ne löi mulle semmosen kännykän käteen, ja se opasti. Mä lähdin käveleä sinne sokkeloihin ja se kerto mitä missäkin on ja mihin päin pitää mennä.

Nainen 2: Mutta eikö museoissakin oo semmosia joissakin.

Nainen 1: Se oli museovene. Vanha sukellusvene. Ja se opasti, että mitä missäkin on.

Nainen 2: Mutta sehän onkin hyvä. Sehän korvaa toisaalta ihmisen, että siellä saa valita sen kielen ja..

Nainen 1: Että saa omaan tahtiin mennä kato. Se puhuu aina kun kävelet kaks metriä eteenpäin se puhu seuraavan jutun. Jos menit takasinpäin, se kertoo sen edellisen jutun. Niin.

Emergency transmitters should be designed so that they don't break off accidentally and they should also be automatic.⁴⁴

Emma 2035

The scenario was evaluated as the best one. The functional model presented in the scenario was seen to fulfil real needs. The costs of using security technology were assumed to be mainly borne by society in this kind of case.

The locating of children was mainly accepted by the group. They thought that older children would innovate new ways to fool their parents if they wanted even with PNS. The visually impaired were again mentioned as a potential user group for PNS. Also PNS for tourists was suggested.⁴⁵

Junk mail

The locating of employees was accepted in working hours and on duty. Push services (ads) divided opinions in the group: some were against ads in general while others adopted a more neutral point of view: one can decide for oneself what kind of ads are acceptable.

Closing speeches

Emma 2035 was still the best scenario; *Junk Mail* and *Afternoon Dance* were the most unbelievable.

According to the group the most usable environments for PNS were unfamiliar places (city, wilderness, forest) or environments that are hard to outline somehow (parking halls or lots). Potential uses also mentioned for PNS: to get information on specialities or special services and their location (seeking rare books, car stations).⁴⁶

The participants would probably need and use applications of PNS in the future. It was seen as important to first get used to the new technology and to the possibilities that it offers. The locating of the participants themselves was accepted in some cases (security) by relatives or the emergency operator.

3.1.6 Disabled

Visually impaired

⁴⁴ Haastateltava 1: Se on nimenomaan sillai, siinä on nimenomaan nää koordinaatit. Sen takia kun mä puhuin tästä, että kun mä aattelen sitä, että tämmöset laitteet, että meillä on paljon tarpeellisempia kenttiä kun se, että jonkun tanssihomon tai muun itsensä, sanotaanko lainausmerkeissä lähes terveeseen ihmisen jonkun tämmönen avittaminen, niin semmonen jossa on niitä, jotka ei välttämättä pysty käyttämään ja suuntaamaan sitä, vaan se on automaattitoimintainen. Se olis se, jos on niinkun turvallisuuden kanssa. Ja silloin ei puhuta mistään isoveljiä, vaan silloin puhutaan nimenomaan siis, sanotaanko sellasesta automaattisesti auttamisesta, jonka tarve tulee määrättyssä vaiheessa.

⁴⁵ Haastateltava 1: Tämmönehän pitäis kehittää kun Tampereelle tulee turisteja omalla autolla, niin lyödä semmonen käteen ja sanoo, että tossa on ohjeet lähtekää kiertään.

Haastattelija: Niin tämmönen kaupunkiopastus.

Haastateltava 2: Parkkipaikat kertoo ja kaupungin historian ja liikkeitä ja.

Haastateltava 1: Ne monet meidän nykyoppaat korvais aika hyvin.

Haastateltava 3: Mutta kuitenkin semmonen henkilökohtainen kontakti, niinkun opaskin.

Haastateltava 2: Voi kysyä oppaalta.

Haastateltava 3: Koneelta ei voi kysyä

⁴⁶ Haastateltava 1: Tai semmonen kun tapahtu tossa Tampereen ja Kangasalan välillä, että autosta puhkes rengas, eikä ollu minkäänäköstä tietoo missä olis rengasliike. Niin silloin olis ollu, silloin ei ollu meillä kännykkäkään ja mies sitten sano sen jälkeen, kun mä olin ajanu sillä tyhjällä renkaalla ja hakenu liikettä niin sano, että kyllä olis hyvä olla autossa semmonen pumppu, jolla saisi siihen renkaaseen ilmaa. Mä sanon, että olis ihan paras, kun mulla olis ollu kännykkä, että mä olisin autossa istunu ja saanu sen avun. Tai tää navigointi, että mä olisin...

The group of visually impaired people found reliable location-based services really useful and could see their potential in helping the visually impaired to increase their independence and confidence to act on their own. The threshold of leaving your home would be lower if you could be absolutely sure that you would at least be able to find your way back in any case. It would make everyday life much easier if the navigation services could give a warning of road works in the city area and maybe also advice on alternative routes.

Pub

The members of the group who have to cope with nyctalopia (night-blindness) found it very useful to locate friends even inside a pub, because in the dark environments (pubs, restaurants) they easily fail to notice people. A couple of people in the group were concerned that turning off the device would not be that simple in the future. They were not primarily referring to the features of the navigator, but suggesting that a social pressure to have the service on all the time could potentially develop. If turned off even for a short time, other people would worry and start to suspect different reasons, and therefore it would be less stressful to let other people locate you. One of the interviewees (woman) also had a doubt that locating other people could alter the relationships inside a family and therefore cause jealousy and other problems. Other interviewee (man) thought that a relationship where locating can break the mutual confidence is not on a solid basis to start with.

Exhibition

One of the participants had an experience from the Louvre, where he had tried to find the “Mona Lisa” and after an hour had found it by following other people. In that kind of situations he was willing to use a navigational aid in the future. The group emphasised strongly the importance of alternative speech-based input and output methods. A larger display would not help them; they would have to get the route guidance and exhibition information in speech mode.

Junk mail

One of the interviewees found the commercial push services completely useless because he never read ads and sale offers anyway. Other participant preferred a search service that could tell which stores had a particular object in the stock. This would help visually impaired persons to plan routes more precisely beforehand.

Abroad

The scenario did not at first elicit any significant opinions or ideas, but the conversation afterwards was very interesting. One male participant told about his fishing hobby.⁴⁷ In the end the group concluded that the significance of navigation services to the visually impaired is determined by the level of independence that they can offer.

Physically disabled

The group of physically disabled people pointed out several times the importance of knowing, for example, the routes suitable for wheelchairs. Making it easier to choose and find parking places, taxis and toilets especially designed for disabled would be a valuable service. Knowing whether buses, stores and restaurants were accessible by wheelchair would also help the physically disabled to plan their lives.

Pub

⁴⁷ Haastateltava 1: Siinä on se hienoo, että kykeneen niinkun itsenäisesti selviytymään tietyistä asioista. Mulla on semmonen suuri henkilökohtainen ongelma, kun mä harrastan tota kalastusta, ja mä haluan ehdottomasti yksin mennä sinne järvelle, laittaa verkot ja. Se vielä onnistuu, mutta autaa armias, kun mä seuraavana päivänä lähden niitä sieltä etsimään. Siinä sitä ollaan.

The group emphasised several times that the final decision whether your friends can or cannot locate you should always be made by the one whose position is sought.⁴⁸ Also in cases where acquaintances or relatives come to visit, it would be handy to be informed in some way.⁴⁹

Abroad

The group agreed that improving people's ability to summon assistance in cases of emergency is valuable and needed. One of the participants doubted whether the system described in the scenario would honestly work in every country and in every culture.⁵⁰ Also the importance of location-based tourist information was discussed widely. One of the interviewees pointed out that knowing exactly where you are would be valuable information especially abroad. On the other hand, one participant thought that locating yourself would diminish the pleasure of finding places by accident.

Junk mail

The situation described in the scenario was found irritating, but somewhat differently organised location-based search services were found useful. Also the need for the information concerning routes suitable for the disabled was pointed out.⁵¹ One interviewee expressed unreserved resistance of all marketing approaches.⁵²

Ride-sharing

The interviewees agreed that in the shared transportation services that they regularly use, positioning the vehicle would help to avoid unnecessary and frustrating waiting.⁵³ One participant pointed out that it would

⁴⁸ Mies 1: Ai niin, että se vastuu siirtyy sille, joka on ottanu sen, et jos vaikka on aviopari ja ukko tai eukko käy vieraisa ja jää kiinni kännykän takia, niin juridinen vastuu ei oo enää sitten tällä laitteella, vaan...

Mies 2: Tuomokin haetaan kesällä äkkiä terassilta pois, kun tietää missä se on.

Mies 1: Niin justiin se vaara on. Herättää epäilyksiä, jos laittas sinne, ettei saa selvittää missä on.

⁴⁹ Mies 1: Jos jotain nyt semmosia henkilöitä on sillä hetkellä, että tota et joka haluaa et saa tietää missä on, taikka voi ottaa kiinni. Et ettiä, ei nyt välttämättä täällä oo just sillai, et vois sitten soittaa sinne ja ottaa selville, missä päin on että. Tulee vaikka jostain kauempaa, niin, ihan tässäkin montakin kertaa siinä on paikalta poistunu, että tulee tänne vieraita ja tota noin niin, semmosia mitä olis halunnu nähdä ja ei oo paikalla, niin vois vaikka ottaa selville että missä on, saa yhteyttä.

Haastattelija: Niin jos tulee jotain vieraspaikkakuntalaisia tulee tai jotain tällasia?

Mies 1: Niin, nimenomaan sillon. Eikä välttämättä kaukanakaan tarte olla...

Mies 2: Ei niin.

Mies 1: Tästä, niin tota, menee jo ristiin, että.

⁵⁰ Nainen 1: Niin, no kyl se varmaan joskus on, että että ajattelee Suomi teknologijamaana, niin sitten joku, joku tommonen, tai jos mentäs vaikka Afganistaniin lomailemaan niin epäilen, että.

⁵¹ Mies 1: Just se, toi olis tosi hyvä, että saa tuon tiedon, ettei tarttis soitella montaa kertaa, että pääseeks teidän liikkeeseen vai ei? Vois sitten ruksia, ettei tarte sellasia liikkeitä ollenkaan, joilla ei oo minkäänlaista. Vois boikotoida suoraan.

⁵² Haastattelija: Mutta että mitä tahansa mainoksia te ette haluais tulevan?

Nainen 1: Ei. Käykää kattomassa meidän taloo, että kuinka monessa ovesa lukee ettei mainoksia, kiitos. Niitä on aika monta.

⁵³ Siinä on ainakin samoja justiin, että saa, löytää paikalle ja tommosta ja sitten se, että se automaattisesti ilmottaa se navigaattori siihen toiseen, et jos niinkun on sovittu joku aika, se kattoo et tästä on niin pitkä reitti että tuo ei muuten tätä vauhtia kerkeä. Sit se ilmottaa automaattisesti sinne, että ei sun tarte sen ajon aikana ruveta soittelemaan, et hei mä myöhästyn. Ja se toinen voi kattoo siltä omalta navigaattoriltaan et missä kohdassa se on tulossa. Eikä suotta hätäile, että jos on kiire siinä, että äkkiä nyt vaatteet päälle ja sitten kun on vaatteet päällä siinä oottelee, niin sitten tuota, sehän paistuu takki päällä. Et ois voinu vähän rauhallisemmin ottaa aamun, kun näkee, et se on vähän myöhässä.

be dangerous if people were to rely on the systems too much especially when surrounded by other traffic. The group also discovered a new function for the device: to locate vacant parking places.⁵⁴

General Discussion

The Exhibition scenario and the Junk mail scenario were found most credible. The participants thought that the Exhibition case would be useful especially for busy businessmen. The Junk mail scenario got a contradictory response, but in the end it was found quite probable. Physically disabled people would find it very difficult or in some case impossible to use separate devices. Instead, they thought that integrating a navigator into the interface of an electrical wheelchair would be a good solution.

3.1.7 Students of well-being technology

The scenarios were presented to this group for the first time at the interview. The presentation of each scenario was followed by a discussion, and in the end there was more general discussion on the various aspects of PNS.

Emma 2035

Privacy was highly valued in this group and the participants did talk about autonomy and freedom in relation to PNS. Nonetheless, localisation was accepted in the case of serious illnesses like Alzheimer. In that case it was pointed out that the system should be very easy-to-use (not a communicator, speech control, wristband) and in many cases automatic (in the case of getting lost or an emergency).

Locating children was mentioned as one application for PNS.

The participants thought that if the system reduces the costs of social and health services, then it should probably be almost free for users, i.e. society would pay the costs. If a person wants this kind of security device but is not suffering from an illness such as Alzheimer, then he/she should pay something for the use of PNS.⁵⁵

Afternoon dance

The social navigation (profile) presented in the scenario was commented on negatively. Reminder (bus changes, medicine) was thought to be a good scenario. Route guidance, locating services, places and oneself were considered very useful in different kinds of environments (strange city, forest, and travellers).

⁵⁴ Mies 1: Tuli vaan toi mieleen, et niinkun jos on niinkun omalla autolla liikkeellä, et siitä navigaattorista näkis miten niinkun missä on parkkitilaa ja tällästä. Ei tarttis, mis ois niinkun vapaata parkkitilaa.

Mies 2: Joo, joo.

Mies 1: Ja sitten, että onko siellä justiin toi invapaikkoja vapaana, että missä on semmonen paikka että pääsee niinkun, ei tarte haeskella.

⁵⁵ Haastattelija: Mitä se tuommonen sais maksaa? Sanotaan tuommonen palvelu? Kuinka monta kymppiä vai sanotaanko satasia?

Mies1. Sehän vähentää kustannuksia ja turhia käyntejä niin paljon että KELA maksaa kyllä.

Mies 2. Tuloista se varmaan ois kiinni, että paljonko maksaa.

Mies 3. Kyllä mun mielestä nimellinen maksu tai korvaus voi olla siitä.

Mies 2. Niin voi olla satanenkin kuussa tai...

Mies 3. Satanen kuussa kyllä, että pystytään ylläpitämään näitä juttuja. Jonkun verran...

Mies 2. Ja yleensä varmaan, jos joutuu maksamaan siitä, niin huolehtis varmaan vähän paremmin siitä laitteesta. Ois vastuu tavallaan siitä.

5. Ja sittenhän sitä korvausta voidaan sovittaa. Että jollekin maksetaan koko homma ja joku voi haluta vaikkei tarviiskaan, niin sitten maksaa itte sen.

3. Tietysti jos aatellaan, että suhteutettas siihen käyttöön.

2. Mut sitten vois muutamilla ihmisillä olla, ettei sitä käytettä sitten

The usability of small displays was doubted. The distributed system was considered rather complicated.

Pub

The scenario was thought to be suitable for younger users.⁵⁶ The locating of one's own friends was considered dubiously and not useful for the group members. Privacy was again said to be in danger when using PNS. Some members of the group thought that there was scope for deception as far as localisation was concerned.⁵⁷

Junk Mail

Commercial information by PNS was evaluated positively. Smart search was seen as a useful tool in purchasing goods and looking for bargains.

The group viewed the locating of employees negatively. The group was asked to think about applications for indoor navigation e.g. in exhibitions or museums. PNS was seen not as very usable in exhibitions for the participants. A few also commented at this stage that they are against the prevalent hype of technology and effectiveness.⁵⁸

Locating people was discussed again. The participants themselves did not want to be located. Locating children divided opinions radically in the group. Some did not accept it at all, while others (the 2 persons with children) thought it could be a good precaution against accidents and would reduce the anxiety of parents.

Localisation was seen as a useful precaution in the case of outdoor pursuits.

The participants did not see themselves as users of PNS in the near future. The group thought that PNS was mainly needless in their own lives and that the price of the services was too high for them.

First users of PNS were thought to be professionals and elderly people with memory disorders. The possibility of better quality healthcare was considered to be the best application of the technology. On the other hand, the group commented on certain threats that the new technology might pose in the care of the elderly (staff reductions, loss of personal contact).⁵⁹

⁵⁶ Mies 3: Sitä pitäis olla semmonen urbaani citiaikuinen. Semmonen nuori aikuinen. Koko ajan menossa ja. Että ois tarvetta..

⁵⁷ Haastattelija: Mut nyt se sitten näkys heti, että missä nää oot. Ei vois valehella tai huijata?

Nainen 5. Niin. Siihen leikkiin me ei aleta.

Mies 2. Mutta toisaalta voishan sitä hämätä. Jättää kännykkä jonnekin.

Mies 3. Niin lähtee vaikka roskia viemään. ja laittaa kännykkä roskikseen ja lähtee kävelemään.

⁵⁸ Mies 2. Voishan se olla yks semmonen informaationlähe. Jos ei uskalla kysyä keltään, niin näkis omasta kännykästään.

Mies 1. Ei kai sitä navigointii tarvii niin pienissä kun messut ja muut.

Mies 3. Voishan se olla ihan hyövyllinenkin palvelu, mutta en minä tiiä... Mua närästää tuo kauhia tehokkuus. Kaikki pitäis, koko elämä ohjelmoija. Tullee ko tuosta sitten niin riippuvaiseksi sitten.

Mies 1. Ainakin jos lyöpi sirun ihon alle ja viivakoodin käsivarteen.

Mies 3. Tuntuu joskus, että niinkö...että säästää sitä aikaa, niin mihin?

Mies 5. Turhaa tuommonen jollakin messuilla, kun jos mennee esimerkiks tunturiekspoon tai, niin siellähän kaikki kelepää. Kaikki käyään kattoon ja silleen. En minä ainakaan tarvii semmosta jossakin messuilla. Tai joku museo.

⁵⁹ Haastattelija: No oisitteko te valamiit suosittelemaan vaikka ikääntyneelle käyttöön tai sitten sosiaali- ja terveyshuollon ammattilaisille omaan käyttöön tämmöstä.

Mies 4. Joo.

Mies 2. Joo. Se riippuu sovelluksesta aika paljon.

3.1.8 Discussions with others

Memory disorders

Because of the limited time it was not possible to interview all those groups that might be interested in personal navigation or for whom personal navigation could be beneficial. Instead of interviews, some discussions were carried out by telephone with people working in the area or working with people who might require some services or achieve better security through personal navigation.

Some of the scenarios were written to take account of the situation of people suffering some minor memory disorders. During the very first steps of the interviews the aim was to find some people suffering from memory disorders. After some contacts we realised that it was difficult to find such a group. While searching for such a group, some discussions were held with people organising services for demented people and also with one elderly lady taking care of her demented husband.

Discussions were held with the director of an old persons' home, the executive director of an old-age service centre and the dementia advisor of the Tampere region of the Dementia Association. According to their experience, people who have minor memory disorders are in some way lost to service providers, because they find different ways to manage in their daily lives without extra support or supportive services. Quite often people develop many kind of memory rules before their admit or realise that they need help or technical aids. They resort to services, e.g. medical treatment, only when they are no longer able to cope on their own.

All three experts saw that personal navigation could be beneficial for people suffering from minor memory disorders, provided that they can get the device early enough to be able to learn to use it. In their opinion it could be helpful to family members if they were able to locate the user when he/she gets lost.

According to the dementia advisor, the scenario stories were good and usable in practice. She said that they seemed to be credible and they described future solutions which could be acceptable. One aim should be to find a lost person as quickly as possible. If people start to use these devices before severe memory disorders develop, they are still capable to learn to use them. When dementia is severe, people cannot learn to use new technical devices. The dementia advisor thought that the permission for localisation could be given by the user in the early stage of dementia, but later on it would have to be given by a family member or, if no family members were available, by local social and welfare authorities. It must also be realised that the profile and progress of an illness are always personal.

Home caretaker (wife)

The telephone conversation lasted about 30 minutes and was carried out in a good atmosphere, even though the interviewed wife seemed to be a little bit tired of taking care of her husband. The discussion therefore seemed to have a therapeutic dimension. The age of the wife was 77 and her husband was 76. They live together in a row house. The husband's dementia had been diagnosed in 1997 and it is based on blood circulation problems. As a result of these circulation problems he also has mild left-side hemiplegia and vision problems as well, e.g. double vision. The husband also had a heart pacemaker. The husband is a war veteran and is now waiting for his rehabilitation vacation at Veljeskoti veterans' house.

Naiset 4 ja 5: niin niin

Mies 3. Ja sitten tosiaan siitä, että mä aattelin sitä sillai kyllä, että se tois ne hommat siihen, että niillä hoitajilla säästys aikaa semmoseen henkilökohtaseen kontaktiin enemmän sen vanhuksen kanssa, eikä kävis sillai, että karsittas sitä työntekijä porukkaa sitten.

Mies 1. Pelekästään. Jos ihminen ei enää käy siellä kotona enää, vaan hoietaan koneilla kaikki.

Mies 3. Niin. Siinä ois yks hoitaja ja sata vanhusta ja se niinko vaan on semmonen teleoperaattori, että kattelee monitoreja. Tosiaan, että se vähentäs sitä. Vähentäs turhia käyntejä, että sitä tosiaan jäis aikaa sitten sen ihmisen kanssa touhuta asioita.

According to the wife, her husband needs daily help and someone must be aware of his movements 24 hours a day. When the man goes outside their home beyond the property boundary or immediate neighbourhood, he needs someone with him or he must take a taxi. Sometimes he walks around the neighbourhood area where everyone knows him and will help him if needed. Once when the man left alone to the health care centre, he got on the right bus to the health care centre, but when he arrived he left immediately because he was not called into the doctor's consulting room. He did not realise that he was too early. His wife had followed him on the next bus, but he was already on his way back home. In the first place, the idea was to travel together, but the wife was not quick enough and she had helped her husband to put coat on before her own coat.

The family had realised that some problems might crop up and they had tried to use a mobile phone as an assisting device. Unfortunately the man couldn't use the phone properly because of his clumsy fingers. Quite often he pushed the wrong buttons and unknown people received phone calls.

This couple did not see the written scenarios, but during the phone call information about personal navigation was discussed with the wife and she seemed to understand possibilities of using PNS. Not all of the other scenarios were described to her. According to the wife it could be beneficial to be able to monitor her husband when he is walking around the neighbourhood. Because of the hemiplegia, the husband could fall down and he is not capable of getting up without help. In these situations he could get help from home if his wife could follow his movements. Also the possibility of securely attaching the navigator to the husband was discussed.

Volunteer fire brigade

A phone call to a man working in a volunteer fire brigade led to an interesting conversation about navigation and searching for lost people. He said that all ski tracks are planned to lead eventually to a road, so people who get lost will always end up at a roadside. During the winter there has never been any need to organise a real search. The situation is different at other times of the year, when people sometimes stray from paths and tracks. During summers and autumns it has been necessary to search for elderly people and sometimes war veterans. According to the volunteer, lift companies have mountain bikes that can be used to recover people who have e.g. broken their legs. In the area of the ski centre there is a SKI-radio, which is occasionally used to give safety instructions to tourists and other visitors.

Once, a person with dementia had gone into the forest alone, but he was finally found at his home. According to the volunteer, personal navigators could be useful and people would use them when they are available. During autumn 2000, they had three lost people to find. They were lucky and found them before they had to make any police alarms.

In the volunteer's opinion, the use of mobile phones has minimised the numbers of forest fires, because people can sound the alarm right away and there is no need to find a public telephone. He also said that some tourists had asked about the possibilities of rent out a GPS device. He believed that some people would be interested in renting out navigator devices. It could be useful for many tourists. The price should not be too high. He thought that safety and security will become more and more important in the future and that people are interested in their own possibilities to ensure their safety and security. He mentioned that people are willing to pay a rental fee and, in addition, reasonable charges for usage.

3.2 Main themes

3.2.1 Privacy

When considering the biggest threats involving information systems, probably none is more paradigmatic than the issue of privacy. Highly developed information systems have made it possible and easy to store and

combine huge amounts of information. Quick and easy information retrieval has made it tempting to use the systems for ethically problematic and questionable purposes. (Moor 2000, 200) With the increasing accuracy of positioning and rapidly developing location-based services, the privacy issue is becoming, if possible, even more important.

Quite soon in our research it became obvious that privacy isn't just an issue mentioned in ceremonial speeches; it was frequently brought up in the discussions with every interviewed group. The importance of individual and autonomous decisions concerning positioning was one of the clearest messages people wanted to send to engineers and designers. Only in a couple of cases did an interviewee proclaim that he didn't care even if everyone could find out his location. Generally, the attitude on positioning was ambivalent. On the one hand, people wanted to see the advantages of the described services but on the other hand emphasised that they should be able to make the final decision – whether someone can locate them or not – autonomously on their own.⁶⁰

Many participants wanted to make sure that it is easy to turn off the positioning services but still be able to use the phone features and other information services. Some groups saw the future quite negatively and presumed that anyway the culture would develop so that eventually you cannot turn any services off.⁶¹ Also the problems of professional use and company-owned devices related to the issue of privacy were discussed in several groups.⁶²

The risks concerning the level of privacy were often conceptualised in terms of surveillance. Separate services were frequently connected to a broader social structure and to the idea of a highly organised and totalitarian society. One of the phrases repeated very often was '*Big Brother*', referring to the novel '1984' by George Orwell. Orwell's dystopia is one of the most powerful and most generally used visions when discussing the future of privacy (for more, see Heinonen & Hannula 1999, 29-31).

In Orwell's story the electronic media manipulates the masses with continuous propaganda. Winston Smith – the main character – who tries to create individual consciousness is broken down by the society of surveillance. Although all the participants were hardly aware of the details of Orwell's novel, the image of Big Brother is still powerful and has to be taken seriously. Direct references to the Big Brother issue appeared in a wide spectrum of contexts. Some participants used the term to represent all the biggest threats of the location-based services.⁶³ Other interviewees did not see it plausible that people would really accept

⁶⁰ Haastateltava 1: Siinä täytyy olla just nämä, että pystyy valita siihen omaan ryhmäänsä, että ketä siihen kuuluu.

Haastateltava 2: Niin se on ensiarvoisen tärkeää.

Haastateltava 1: Sitä pystyy niinkun, ettei se oo semmonen kiinteä, että sitä pystyy siinä, otat laitteen kouraan ja klikkaat jonkun pois ja jonkun päälle.

Haastateltava 2: Tänään en tykkää susta, enkä halua.

⁶¹ Haastateltava: Se olis, kyllähän sillain toimis, jos se vain päätöksenä vois toimia niin, että siinä varmaan se menis sitten lipsuis siihen, että no ei kyllä se on pakko pitää nyt päällä ja näin, että tämmöstä näin

Haastattelija: Niin varmasti, just se semmonen samanlainen sosiaalinen paine?

Haastateltava: Se ois se varmaan kuitenkin, että ongelma siitä loppujen lopuksi tulis. Tässä on ihan sama se, kun mulla on niinkun työn puolesta puhelin ja niinkun tavallaan se rooli on koko ajan päällä, siitä, että jos mä nään, että joku tietty tyyppi soittaa, mää joudun tiettyssä roolissa vastaamaan ja oltava, se on just se sama niinkun jo kännykän kanssa sillai, että ei aina välttämättä jaksais, mutta aina täytyy.

⁶² Haastateltava (mies): Tää on sellanen kysymys, että tässä vois niinkun ajatella, että tää työntekijä, sehän voi olla vastaamatta siihen, tai reagoimatta mitenkään, mutta voiko todellisuudessa, jos on työnantajan laite ja se työnantaja sanoo, että sä sitten pidät sitä päällä. Kuinka moni sitten voi sanoa, että en pidä.

⁶³ Haastateltava (Liikuntavammaisten ryhmä) : Se tietosuoja on niinkun aivan ehdottoman tärkeä, että se olis niinkun käyttäjistä ittestään lähtevä, että tota pystyy sen kontrolloimaan, että ei tuu mitään *isovelä valvoo*.

Haastateltava 1 (Mummon kammari): Ensin tuli mieleen, että *isovelä valvoo*.

Haastateltava 2 (Mummon kammari): Samat sanat. Ja sitten se yks oli, että voiko se tekniikka mennä näin paljon eteenpäin, mutta ehkä se voi, onhan se nyt kolmessa vuodessa menny muutenkin.

the surveillance that the described services represented.⁶⁴ Also the issue of locating children and young people raised the spectre of Big Brother.⁶⁵

3.2.2 Safety and control

Alongside with privacy, the issues of safety and control were discussed widely in the interviews. There was another interesting reference that appeared side by side with the Big Brother quotations. The collection of phrases describing *microchip implants* was very diverse and innovative.⁶⁶ The groups agreed without exception that locating services can bring significant improvements in the case of people with memory disorder or dementia. In the context of dementia patients, the interviewees did not see any major ethical problems concerning locating. The microchip implant aspect was introduced also in this context.⁶⁷

The issue of locating children evoked a controversial response. Some people saw the benefits clearly and were inspired by the possibilities for improved safety. On the other hand, many parents found it unlikely that they would use such services. The main argument was that the child's awareness of being frequently located could break the bond of mutual confidence and understanding, and the parents did not want to take that risk. Equally, the children found it difficult to accept continual surveillance.⁶⁸ When asked about a suitable age limit for locating children, the participants found it very difficult or foolish to draw a specific line. Some people doubted whether the expensive devices should be given to children at all. Others worried that the illusion of perfect surveillance would bring down the level of traditional care taking.

One interesting and repeated theme that emerged in different forms with several groups was the idea that locating and navigation services should not be thought of as substitutes for traditional skills. Debates took

⁶⁴ Haastateltava 1 (Jalkapalloilijat): Mut sä niinkun kysyit sitä, että mikä se, mikä on utopistista niin, sen mitä me ollaan tässä oikeestaan koko ajan keskusteltu, se että ihminen suostuis tavallaan sen kautta, että sillä on mahdollisuus ottaa kontaktia johonkin, niin sehän on samalla myös, että sen on oltava valvonnan alaisena, et se on myös sen kontaktin toisena osapuolena. Että ihminen suostuis siihen niinkun täyspäisesti ja täyspäiväisesti, niin mää en usko siihen. Et voi olla se tietyn ajan, jos sillä on joku työaika tai joku niin tai joku aika ehkä, mutta tota en mä usko että ihminen niinkun jatkuvasti haluais olla, et joku tuolla valvoo, kun mä nukun tai jotain.

Haastateltava 2 (Jalkapalloilijat): Omakohtasesti se tuntuu ainakin hemmetin pelottavalta se systeemi.

Haastateltava 1 (Jalkapalloilijat): Vonnegutin sähköpiano.

Haastateltava 1 (Jalkapalloilijat): 1984, nää rupee olla ihan semmosta.

⁶⁵ Haastateltava (Perhe Lempäälässä): Ja jos ajattelee niinkun nuorten kannaltakin, että nuoret ei välttämättä, että äiti koko ajan seuraa jotain, että missä kuljetaan. Tietysti sillon, kun on ihan lapsesta kysymys, niin ne on ihan hyviä. Mut mitä vanhemmasta lapsesta tai nuoresta on kysymys, niin tulee vähän semmoinen niinkun *isoveli valvoo* -tunnelma.

⁶⁶ Isä: Mutta tämmönen seuranta, yks skenaario on se, että sitä ei toteuteta millään mukana kannettavalla laitteella, vaan jollain sirulla, joka laitetaan...

Äiti: Joo, jippii...

Isä: Synnytyslaitoksella.

Äiti: Valmiiks voidaan korvalehteen istuttaa.

⁶⁷ Haastateltava 1: Yks hyvä isäntä tossa noin, on asunu koko ikänsä kesät tossa, tää Ilosen pappa, niin se tuli, oli mustikassa ja tuli siihen meidän puolelle tosta mäen ylitte ja kysy, että missä mä olen. Ja tota, mitä mä heti otin sen autoon mustikkakoreineen ja koko ikänsä kulkenu noita mustikkamaita tossa. Niin vein sen sitten tohon mökilleen takasin.

Haastateltava 2: Sitä vois ny jo laittaa itelleen semmosen sirun, kun luulee olevansa vielä tolkussaan.

Haastateltava 1: Joo, aivan.

⁶⁸ Äiti: Mutta en mä tiedä onko se siltikään toivottavaa, kyllä ihmisen itte pitää saada se päättää se rehellisyytensä aste. Vai mitä?

Tyttö: Mulle tulis ainakin siinä semmoinen, että jos mulla olis semmoinen, niin tulis semmoinen, että vanhemmat ei oikein luota, että missä on, että koko ajan semmoinen kauheen niinkun, tai semmoinen vangittu tavallaan olo, että kun koko ajan vahtii, että missä on.

place when considering the navigation services in traffic⁶⁹ and also in hobby related issues. The boaters emphasised that at first you should master map and compass and the navigation services should be evaluated only on the basis of the additional help they can bring.⁷⁰ The concern of maintaining the “old” skills can be interpreted at least in two different ways. In the case of any new technology and form of services, there are certainly always some opposing opinions and also some romanticism attached to the “good old days”. On the other hand, people already have quite a lot of experience of mobile devices and services and are therefore aware of the performance of batteries and networks and their limitations.

In the case of control, people also expressed a worry about the influence navigation services could have on general attitudes. Binding oneself too tightly to the navigation device could restrict the number of happy coincidences and the pleasure that can be derived from searching and finding.⁷¹ Therefore it is important not to underestimate the significance of aesthetic observations and opinions (Sotamaa, Topo, Saarikalle, Rauhala & Vainio 2001, 6). Aesthetic aspects have a powerful influence on the well-being of human beings and what the potential user groups least wanted was the loss of space – both familiar and unfamiliar – to device-driven operation.⁷²

3.2.3 Social navigation

Attitudes towards different aspects of social navigation differed a lot between the groups. Controlling people with PNS was accepted in cases of potential danger or decreased feeling of safety. However so called social navigation, locating friends or family members just for fun or to ease the flow of true information between participants, was seen as an over-emphasised tool to control each other. The interviewees also thought that this kind of services would make your social interaction abnormal.

Like in the case of route guidance and value-added information in museums and exhibitions also services like “I Meet You” and “Business Card” evoked an ambivalent response. On the one hand, some persons saw that such services could smooth the user's way to get to the right place or person. On the other hand some persons saw that surprises as well as accidental meetings with other people and things (paintings, cars and so on), is one of the basic elements of being a human-being. Everybody plans his/her future some way but the opinions vary on how far people want to plan their lives beforehand.

Among the people not familiar with each other beforehand social navigation was seen as a tool to meet people with same interests, either in professional world or at leisure time. Meeting new people this way

⁶⁹ Haastateltava 1: Siinä on vaan sitten ettei siihen ala luottamaan liikaa, että jos, että voi, jos se ei ookaan sitten, siis tää on niin täydellinen järjestelmä sitten, että silloin olis sitten jalankulkijoita joilla ei oo mitään varoituksia siellä, niin. Ja täytyyhän sekin ottaa huomioon. Jos se noitten koululaisten ja kaikkien, miten se sitten pelaa sen kans.

Haastattelija: Niin, että onko virhemahdollisuuksia.

Haastateltava 1: Tai ainahan sitä pitää kumminkin varovainen olla.

Haastateltava 2: Ettei niinkun omaa järkeä voi mihinkään jättää niinkun ihan.

Haastateltava 1: Ei ei ei. Tähän on vaan tavallaan niinkun kuitenkin apuväline.

⁷⁰ Haastateltava 1: Kyllä se toiminnan luotettavuus kuitenkin on sillai että, että se täytyy olla sitten, jos semmonen palvelu on olemassa niin se täytyy aina pelata, että ainakin jos vesillä liikutaan ja navigoinnista puhutaan niin.

Haastateltava 2: Nykyisten laitteitten perusominaisuus on se, että ne ei toimi.

Haastateltava 1: Niin, mää niinkun edelleen suosittelen kaikille, että opetelkaa lukeen karttaa ja kompassia.

Haastateltava 2: Miten hienot laitteet tahansa.

Haastateltava 1: Mitään vanhaa vehjettä ei voi jättää veneestä pois tän takia, että tää ei korvaa mitään, tää on vaan yks vehje lisää, täytyy olla se kartta, valoheitin ja kompassi edelleenkin.

⁷¹ Haastateltava 1: Mut en haluais et tulee liian, liian niinkun tämmönen kahlitseva systeemi, että vie tosissaan sen etsimisen, kokemisen semmosen ilon, että kun kaikki on niinkun valmista, et joo tota reittiä tosta noin, etkä poikkee siitä mihinkään niin, niin tota, ei tiedä mitä kaikkee siellä voi siellä matkan varrella löytää. Tai menee niinkun laput silmillä.

⁷² Haastateltava 1: Niin. Mutta oisko se vähän häiritsevää, että niitä koko ajan piipittä.

Haastateltava 2: Eihän sen tarttis piipittää. Panis sen pois.

Haastateltava 1: Mutta ei ne kaikki paa pois. Siellä kaikki vaan kävelee näin, kattoo kännykkää.

could be exciting: the services were compared to blind dates or newspaper ads. Young people were considered to be the first users of social navigation in this sense but the juvenile's own opinions varied radically in both juvenile groups. Social navigation was considered exciting and useful when you could quickly see how your character matches with others. In this way you would not waste time in trying to date somebody totally unsuitable for you. On the other hand social navigation in this sense was seen suitable only for socially unskilled persons. Also the intelligence of the device to know right matches was doubted. Groups finding groups with similar interests would be useful.⁷³

Social navigation as a tool for a group of people who know each other beforehand was commented suitable for some groups. Youth groups were thought to be among the first ones to use this kind of applications and also the comments gathered from the youth groups support this argument. It was pointed out that in short phone calls and in SMS messages the most important information needed and given is the location of people. The need to know other people's location was commented important because it is needed to make meeting points and times more flexible. This kind of use was expected to save costs in phone bills. Among the youth social navigation was thought to become a common habit and in one group it was innovated to be nice perhaps in purely entertaining use as a part of a game.

Group navigation in the other groups than juvenile was seen useful in unfamiliar environments and in big groups. Tourist use was mentioned as one possibility either in cities or e.g., for hunting tourists in the wilderness.

3.2.4 Expenses

Attitudes towards the costs of navigation services were diverse. Usage charge was favoured in majority of the groups. Exact monthly fees were preferred in the case of juvenile themselves using PNS (Lempäälä) and in regular need of PNS e.g. in case of professionals or demented persons. Society was assumed to pay majority of the costs when using PNS as a precaution in healthcare and social work. It was commented that this kind of system could reduce the costs, because people could live more independently with the help of a navigator. Therefore this kind of services should be paid mainly by society. Equality of getting assisting new technology was also mentioned in some of the groups. People who thought that they could really manage better in everyday life using PNS were ready to spend some money of their own to this kind of services and devices.⁷⁴

The accepted amount of use charges varied from FIM 2 - 50 (EUR 0,3 – 8) depending of the service and duration of the session. FIM 2 was accepted as a payment of simple location information of a place or a service. FIM 50 was accepted as a one-day fee for several PNS services. A couple of people innovated that devices should be rent for irregular use in special situations. The interviewees thought that a special PNS device functioning also as a phone should not cost more than advanced mobile phones at the moment (1000 - 2500 FIM).

3.2.5 Usability

Using PNS as described in the scenarios was thought to be quite easy (except for the system in Exhibition) but the usability of real-life applications was doubted. The development of devices with small displays and displays suitable for using high-resolution maps was generally considered as a big usability challenge. Too complicated systems, both those already in use and future ones, were commented generally as frustrating.

⁷³ Äiti: Tietenkin, jos joku porukka lähtee jonnekin. Vaikka opiskelijaporukka lähtee ekskursiolle jonnekin, niin sittenhän ne niin ku porukalla vois laittaa. Se on tietenkin luonteesta kiinni kuka haluaa. Mutta itestä tuntuu, että ei..

⁷⁴ Äiti: Jos siinä ois se näkövammaispalvelu, et pussi pysähtys kun siitä painas, niin kylhän siitä sitten maksas. Sithän siitä vois maksaa vaikka mitä. Mut ilman sitä, en mä siitä paljon maksas. Pari sataa. Jotain semmosta järkevää mikä ei tunnu sillai missään.

An integrated (phone and navigator) system was favoured in most groups. However, the Hunters were unanimous that separate devices could be practical because a mobile phone was claimed to be more personal than a navigator. A navigation device was commented to be a device for professionals or special interest users (guards, sailors, guides). That is why the systems specially designed for different purposes of use were seen practical. It was also mentioned that the mobile phones are changed every two years because of the fashion. However, the lifetime of a separate GPS device was thought to be many years. In general the location-based services in mobile phones were seen as an useful addition.

In general the usability of distributed systems was doubted. However, a couple of people found such systems possible in case of special groups e.g. weak-sighted and in particular situations e.g., darkness. One very clear reason to this was the unfamiliarity with distributed systems. Another reason mentioned was that a distributed system was thought to make interaction between people unnatural and it was not seen as a near-future application.

There were also some special group requirements mentioned when discussing the starting points for designing PNS. In the group of visually impaired the significance of voice controls in using PNS was mentioned several times. Reliability of PNS services and devices was doubted in many comments. For example following issues raised many sceptical opinions: batteries, antenna range, new it-technology in general, updating. The need for better Finnish manuals was pointed out especially in the group of hunters. The interviewees also hoped that the instructions could be found in the equipment itself. Some doubts were presented about the international use of PNS. It was suspected that the services would not probably work anywhere else than in the country where they are designed and activated.

4 Need of personal navigation in professional use - organisations point of view

4.1 Introduction

Mobile multimedia is now developing rapidly and more services are coming to wireless terminal services. The first impression of personal navigation system, problem of finding the destination, is typically associated with mobile work. However, many other applications of personal navigation are already found useful in professional use. For example in mobile work the employer often needs to know the whereabouts of his employees and equipment at any given time for the purpose of operational optimisation, the efficient handling of urgent cases.

In this chapter we will concentrate on expectations and assumed needs for professional use of personal navigation services. However, it must be remembered, that the aim of this work was to establish only the trade unions' or organisations' point of view - in other words, the professional needs for personal navigation services in larger scale. In the future also the end users' point of view in the organisation should be discovered and taken into account, before the personal navigation systems are implemented in companies and organisations.

4.2 Differences between professional and private use

Professional users are often considered to be the "lead users" of new technical devices and services. Most of the time the basic idea and basic needs for the personal navigation services are indeed same to private and professional users. However, in the professional field the applications are often more custom build according to the company's' requirements. In additions, the decision of implementation of the system is often done in

organisation level and the advantages and disadvantages of the systems are often measured only from the organisations point of view, in other words economically - savings in working time or fuel consumption, efficiency in transportation etc. Also the employees' safety while working is considered to be one of the most important responsibility of the employer and some solutions of personal navigation system can support and enhance this purpose as well.

In organisational decisions the users do not always have the possibility to do the decision of using the system or not him/herself. Especially when the position of employee is been tracked and informed to employer by navigation service, the ethical issues are to be considered more carefully than with personal use of navigation services.

4.3 Methods

In Finland Statistics Finland has classified the Finnish occupations, occupation referring to the work a person performs irrespective of his/her professional status, education or the economic activity of the workplace. The classification of occupations has ten major groups, within which jobs are divided in accordance with skill specialisation. From that list those occupations (table #1) in which at least part of the workers, where assumed to need personal navigation services were selected. The main selection criterion was that the workers are mobile because of their work. To the association or trade union leaders (if the trade union exists), enquiry was send by email.

4.4 Assumed professional needs for personal navigation services

4.4.1 The differences in needs in professional field

Discussions with trade union chairs showed that the needs of navigation services both within the same branch of industry as well as between different branches of industry differ. As example can be mentioned heavy truck and lorry drivers. Some vehicle are built and equipped for one special industry, and have already navigation systems developed by the employees, like forest industry, which has navigation systems in 90% of its fleet. Drivers delivering daily consumer goods have mostly daily routine routes and have only seldom new customers. Instead, drivers for example delivering goods for building sites or collecting animals for slaughterhouses often have new customers.

According to the interviews the needed services can divided into four groups:

- 1) The employee has to know where the employer is
- 2) The employer has to find to an unknown destination
- 3) The employee has to get detailed information about the place she/he currently is
- 4) Location-based information must be added to goods by delivery or pick-up.

4.4.2 The employee has to know where the employer is

According to *The Finnish Taxi Association* taxi traffic is mostly regional traffic, and drives knowledge of service area is tested by an exam before they can get a professional driver permission. Normally, if the lift goes outside of this regional traffic area the customer can lead the driver to the right destination. When driving in driver's own regional traffic area the navigational directions can be get fastest by the taxi centre's radio network. However, in the future navigation services will be needed for new booking systems. When the mobile phones can be located accurate enough, the customer and the closest taxi to him/her can be found faster than nowadays.

Kotipizza ry uses motorcycle drivers to deliver pizzas. The delivery distances seldom exceed 2 km, so the drivers know well the delivery areas. Instead, the owners might need to know the locations of the drivers, to be able to estimate when the driver is back and ready to take a new delivery.

Fillarilähetit K&V Oy uses bicycle messengers to deliver parcels in city centres. Today they don't have any navigation systems, but they would willingly those if it wouldn't be too expensive. The benefits of a navigation system would be 1) the office staff knows where the messengers currently are and could be able to do rerouting after getting new commissions and 2) the messengers would more easily find to their destinations.

4.4.3 The employer has to find to an unknown destination

Of the 9 000 Finnish bus drivers about 50% drive sometimes charter traffic, and might need navigation services to find the destination. In addition, about 100 drivers work for demand responsive transport which means their routes varies all the time. The drivers need instructions how to find the customers and the operator has to know where the busses currently are to be able to plan the routes.

According to the executive director of the *Finnish Estate agents* association the estate agents might need navigation services for example when going to estimate properties or forest tracts on countryside.

According to *Tavaralinjat ry*, which is the association for transport companies carrying regular transport of goods, navigation services would be useful, even if the needs are occasional, personally or by track. Daily almost 5 500 drivers work for regular transport of goods, and it was estimated that daily 5-10% would have problems finding to the destination. Typical for the branch is the big amount of customers and parcels, annually about 5 to 10 millions. Even if delivery locations are mostly standard, new customers and the new addresses of old customers must be found. The satellite based navigation services have founded to be too expensive.

In addition, according to *Sopimusliikenne ry*, which is the association for transport companies of which hauling equipment is built to be suitable for special transport services or for companies, this are specialised for a certain branch. As example can be mentioned transport services for breweries, groceries and building sites. It was estimated that 10% of drivers might need navigation services. Members of the association are interested in navigation services, and the association has already had discussions with telephone operators concerning the development needs.

According to *International Road Carriers of Finland*, some navigation services are already in use. Some express freight trucks have GSM as well as old GPS devices. About 1000 Finnish trucks currently operating in Central Europe might need navigation services, as well as some of about 700 trucks operating in Scandinavia.

According to the chair of *Farmer's locums' association*, in the future the working areas grow. Thus, the farmer's locums will work at new farms, to which the routes might be difficult to find. In Finland, there are about 5000 farmer's locums of which most have mobile phones. However, it was estimated that only few would like to have navigation services, even if the need might be real.

As mention above, in the forest industry navigation systems are widely in use. According to executive manager of *Metsäalan Kuljetusyritykset ry* the three biggest forest companies in Finland, *UPM-Kymmene*, *Metsäliitto* and *Stora-Enso*, whose share is about 90% of wood transport, have navigation systems in almost all of the tracks. As equipment driver's have in the cars PC, GPS and digital map which use the software developed by forest companies. By using the systems, the drivers find the pick-up places of the log piles. In Finland, only the small private sawmills don't yet have navigation systems.

Home service office of *The Central Union for the Welfare of the Aged* estimated that the need of navigation services of their worker's would be occasional and minor. Chiefly the need would occur by new workers or when the old workers have new customers.

4.4.4 The employer has to get information on the place she/he currently is

The express freight companies have systems by which they can real-time follow the location of the parcels. Information is often provided to the customers also by Internet.

Elintarvikealan Kuljetusyrittäjät ry believes that navigation services will be used in the future for example in animal transport. Many farms are located in the countryside and are not visited regularly, so the drivers seldom know the routes by heart.

4.4.5 Location-based information must be added to goods by delivery or pick-up

Schenker and *Danzas*, some of the biggest carrier companies stated, that the navigation services are been developed rapidly in that area. This year the existing system is being developed to include the registration (time, place etc.) of loading and unloading of goods by GSM- device.

Navigation systems are widely used in trucks collecting milk from farms. *Valio* has its own system in all of its vehicles. The drivers use the system to find the milk collection sites at the farm yards.. When transferring the milk to the truck, the system collects information on the amount of the milk and uses GPS to add the data to the farm's record.

4.4.6 Services needed by authorities

In the future, the navigation services used by authorities will probably be connected to VIRVE. The VIRVE network is a new digital radio network to be constructed in Finland for use by and between authorities to improve official communication under all circumstances. Major users of the network are national and local security authorities. The primary users of the public authority network in Finland are the authorities responsible for public safety on both national and municipal level. The most important user groups are the emergency and rescue services, *the Police, the Frontier Guard, the Social and Health Services, the Customs Authority and the Defence Forces.*

For example police IT-management agency estimates the police would need navigation systems for 2 500 to 3 500 polices who work mostly on the streets. Polices needs could be divided into three groups:

- a) Persons calling by mobile phone to emergency centres should be able to be located
- b) Emergency centres should know quite well were the patrols are located to be able to send the right patrol in case of the emergency call
- c) A patrol should know both its own and the other patrols location. Hence, for example the police field leader could more easily group the patrols after the situation.

Table 1. Occupations in which personal navigation services are assumed to be needed in near future. Also the assumed type(s) of needed personal navigation services is defined.

Branch	Occupation	Type of the navigation services, that are assumed to be needed
Legislators, senior officials and managers		
Professionals	Medical doctors	2
	Veterinarians	2
	Nurses	2
	Physiotherapists	2
	Social workers	2
	Journalists	2
	Musicians and dancers	2
	Religious professionals	2
Technicians and associate professionals	Photographers, image and sound recording equipment operators	2
	Building and fire inspectors	2
	Occupational safety inspectors	2
	Forestry technicians	2
	Health officers	2
	Traffic instructors	2
	Estate agents	2
	Technical and commercial sales representatives	2
	Police inspectors and detectives	2
	Social work associate professionals	2
	Night-club and related musicians, singers and dancers	2
	44	

	Clowns, magicians, acrobats and related associate professionals	2
Clerks	Mail carriers	2
	Stock clerks	4
	Emergency officers	1
Service and care workers, and shop and market sales workers	Travel guides and tour leaders	2, 3
	Fire-fighters	1, 2, 3
	Police officers	1, 2, 3
	Prison guards	1
	Protective service workers	1
	Shop, stall and market salespersons and demonstrators	2
Skilled agricultural and fishery workers	Farmer's locums	2
	Forestry and related workers	1,2,3
Craft and related trades workers	Miners and quarry workers	1,2
	Underwater workers	1,2
Plant and machine operators and assemblers	Motorcycle drivers	1,2,4
	Car, taxi and van drivers	1,2
	Bus and tram drivers	1,2
	Heavy truck and lorry drivers	1,2,3,4
Elementary occupations	Door-to-door salespersons	2
	Window and related cleaners	2
	Messengers	1,2,4
	Meter readers and related workers	2
Armed forces	Frontier and coast guards	2

5 Conclusions

5.1 Personal Navigation System

5.1.1 Early adopters

The user groups that we interviewed assumed that the first users for PNS (Personal Navigation Systems) would be found among different professionals and among the people that need extra guidance (including professionals caring for these people). Special interest groups like yachters and hunters already use GPS and VHF navigation devices. These kind of groups will probably be among the early adopters of the new services and products if they detect those as practical solutions for their use. In the interviews, young people were also generally mentioned as the first users of PNS even though some of the youngsters themselves did not see themselves as going on forefront in using PNS.

Ordinary people were assumed to take PNS in use only after the services and devices get more common in the community. The users in our interviews saw real advantages in using PNS but they were afraid of the price, the reliability and the usability of the services and products.

People were ready to pay more of PNS if they can fulfil their real needs with the help of the new services and products. Saving time and money as well as easier management of work and daily life were common expectations for the positive impacts of the new products.

5.1.2 Possibilities - Jungle or City

Route guidance in unfamiliar places was generally seen extremely practical. Wilderness, hobbies related to nature, and cities were mentioned in all the user groups as places where the PNS could be usable. Commercial services and ads based on location were seen amazingly acceptable in the groups. Threats that someone would abuse somehow the knowledge of users location was not commented strongly in this case. It was commented that there will be regulations and legislation protecting persons who use location-based services. People who did not want ads today did not want them either in the future with another media. Most of the people considered location-based ads useful since one could precisely define what kind of bargains one wants to receive and one could make exact search entries for needed items. Indoor navigation was seen rather useless for an ordinary user. In special situations and for special groups it was however mentioned as a practical application.

5.1.3 Threats

Tracking a person without the person him/herself knowing it, was usually seen extremely dubious. Thus the word knowing is here related to the aspects of autonomy and free will. In the cases of small children and adults under guardianship, the users saw tracking as one part of the care - to protect these people from getting lost and harm themselves. Tracking people was also seen acceptable if the person lets him to be tracked. To let somebody to see one's location requires that one knows precisely who, when and why is locating him/her.

Criticism towards new technology was brought up in many groups. Predestined and over-controlled environment was seen dubious. Participants in the user groups mainly wanted solutions to ease their life in some functions but they did not want their life to become totally controlled by the demand of super-efficiency. Fear of radical changes in human interaction, usability of systems and narrow use of new services and products were commented generally in the groups. Fears of abusing new technology and especially localisation technology has been continuously under discussion also in media (e.g. Aamulehti 20.2.2001). This partially the comments of "big Brother watching" and "putting microchips under your skin" raised in the group discussions. Another explanation to the fear of using new automation and information technology in services is a natural human reaction in the case of changing traditional ways to act in the society e.g. changes in communication, losing skills and jobs, loss of control and loss of privacy (Leal 1996, 78-87).

5.2 Evaluating the scenario evaluations - the study

Scenario evaluation is a usable tool in studying aspects that are not yet very common and familiar in the context. Scenarios enable people to think functional models not experienced yet in real life. However, the stories presented in the scenarios were such that they could happen in real life to real persons (exception in our study was the Tarzan scenario). This is why people could identify themselves or probably other people in their community with the persons presented in the scenarios.

Our aim was not to present only so called neutral stories because our assumption was that critical scenarios could brought up some (e.g. ethical) questions related to PNS, which otherwise could be left out of the discussion. In many of the group discussions the critical aspects presented in the scenarios actually made it easier to bring up suspicions, e.g., questions about the rights of the authorities to locate persons. However, the critical scenarios were not only commented as undesirable concepts but in many cases the users also innovated improvements to the scenarios.

Illustrating the scenarios with pictures was seen as a good method to clarify the concepts presented in the scenarios and to lighten up the stories to be easier to go through. Some scenarios were probably too long (Exhibition and Sailing) and too complicated (Exhibition). In general 3-5 scenarios were a appropriate amount of stories to evaluate at a time.

Group discussions went through in majority of the groups rather easily and the researcher did not have to direct discussion too strongly. In some groups there were more than 5 participants and in these cases there were slight problems to get everyone equally with into the discussion.

Terminology of the PNS and e.g. the language and the terminology used in the accompanying letter that was sent to the participants before the interviews were commented odd. Scenarios of course clarify the meaning of the concept but still one has to be careful when launching new services and device – is it better to use existing and familiar terms or create a brand new terminology?

5.3 Next steps

Using location based new services and new technology is still very uncommon among consumers. One reason to this is that there are still rather few service providers to offer these services. Also the navigation devices using other frequencies than GPS (e.g., VHF) are still unknown because they have not yet penetrated to the market. The unfamiliarity about PNS and non-existing experiences of PNS worked two ways. On the one hand the persons were easier to think all the possible ways to make use of the services based on PNS. On the other hand people were rather reserved to approve PNS to their use immediately because they did not know how PNS would be used in practise.

Group discussions and other interviews brought up the real need of PNS for some users in particular situations. The results of the study can give valuable clues of the ways how PNS should be developed for different kinds of user groups. The potential user groups in this study presented pretty well the citizens from child to elderly. Also some special interest groups and people with disabilities participated the study and gave precious information of their potential usage of PNS and especially their usability requirements for PNS. The study can also give a few suggestions to the marketing of PNS: how the concepts should be presented for different kinds of user groups and what are their attitudes and needs for potential use of PNS. However, the results cannot be used as a market analysis because of the qualitative nature of the study. On the basis of this study we cannot tell exactly the potential amount of buyers of the services or products or predict how people would use PNS in real life. Parallel to this study, the Navitarve project has made a quantitative study by interviewing about one thousand people in Finland. The results of these two studies together will build a basic knowledge of consumers' needs and desires for PNS at the moment and form a background for further studies.

In the future it is thus very important to consider the first experiences of different groups with PNS and pilot the use of PNS in different environments. It is also important to study internationally the users and their ways to use navigation systems. In paying attention continuously to the user's perspective in using PNS there is also need to iterate this kind of research approach (scenario study) later in this project again in a more focused sense.

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Appendix 1 Accompanying letter



Hyvä paikannuspalveluiden arviointiin ja kehittämiseen osallistuva!

Liikenne- ja viestintäministeriön Henkilökohtainen navigointi (= paikannus, paikantaminen) (NAVI) kehittämisohjelmassa kehitetään navigointipalveluja käyttäjien tarpeista lähtien. Syksyllä 2000 käynnistynyt ohjelman tukiprojekti Käytettävyys ja Eettinen arviointi NAVI-ohjelmassa (KEN) tukee ohjelmaan liittyviä organisaatioita ja projekteja henkilökohtaisen navigoinnin palveluiden käytettävyyden suunnittelussa ja arvioinnissa. Erityistä huomiota kohdistetaan palveluiden yhtenäisyyteen ja niiden integroimiseen käyttäjän kannalta mielekkääksi kokonaispalveluksi. Projekti tutkii myös palveluiden käyttöönottoon liittyviä eettisiä kysymyksiä. Henkilökohtaisen navigoinnin palvelut voidaan käyttötavan perusteella luokitella kolmeen ryhmään:

- 1) Paikannus ja reittiopastus on perinteisin palvelutyyppejä. Käyttäjälle kerrotaan hänen oma sijaintinsa, kohteen sijainti ja reitti, jota pitkin kohteeseen pääsee. Käyttäjä saa reitin varrella opastusta, jonka avulla hän pysyy oikealla reitillä.
- 2) Henkilöiden ja tapahtumien paikannus mahdollistaa sosiaalisen navigoinnin: käyttäjä voi seurata missä tapahtuu ja missä muu kaveripiiri liikkuu. Tämän tyyppisille palveluille oletetaan löytyvän aivan uusia käyttökohteita sosiaalisten innovaatioiden kautta.
- 3) Paikannetut palvelut auttavat liikkuvaa käyttäjää tietotulvan hallinnassa. Käyttäjä saa kulloiseenkin paikkaansa ja muuhun käyttötilanteeseensa sopivaa tietoa, joka lisäksi on personoitu käyttäjän kiinnostuksen kohteiden mukaan.

Erilaisten käyttäjien osallistuminen palveluiden ja laitteiden arviointiin mahdollisimman aikaisessa vaiheessa kehitystyötä on ensisijaisen tärkeää. Osallistumalla tutkimukseen te edesautatte erilaisten käyttäjäryhmien mieltymyksiä, toiveiden ja tarpeiden huomioimista paikannuspalveluiden kehittämisessä. Kiitoksia osallistumisestanne.

Ohessa on mukana paikannukseen liittyviä kuvauksia, joihin toivomme teidän tutustuvan etukäteen. Mukana olevan taustatietolomakkeen voitte myös täyttää jo valmiiksi. Tilaisuudessa keskustellaan sitten tarkemmin eri skenaarioista. Tilaisuus kestää n. 1,5 – 2 tuntia.

Tervetuloa mukaan tutkimuksemme!

Seuraaviin henkilöihin voitte ottaa yhteyttä, jos teillä on mielessänne tutkimukseen liittyviä kysymyksiä:

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Appendix 2 Questionnaire for background information

Haastatteluun osallistuvan kotipaikka: _____

Haastattelupäivä ja paikka: _____

1. Sukupuoli (rasti ruutuun)

- Nainen
 Mies

2. Ikä _____ vuotta

3. Koulutus

- Kansakoulu
 Peruskoulu
 Ammattikoulu
 Keskiasteen tutkinto (opistoasteinen)
 Korkeakoulu/yliopistotutkinto
 Muu, mikä? _____

4. Ammatti _____

5. Harrastukset, jos useampia, niin luettele tärkeimmät (säännölliset):

6. Perheesi koko?

- 1 henkilö
 2 henkilöä
 3 henkilöä
 4 henkilöä
 enemmän kuin neljä, montako? _____

7. Onko sinulla käytössäsi GSM-puhelin?

- Kyllä Jos kyllä, niin montako vuotta? _____
 Ei Jos ei, niin oletko ajatellut hankkia? _____

8. Jos käytössäsi on GSM, niin kuka omistaa liittymäsi?

- omistan itse liittymän ja puhelimen
 työnantajani omistaa liittymän
 muu, kuka? _____

9. Käytätkö säännöllisesti jonkun muun henkilökohtaista GSM-puhelinta?

- Kyllä, kenen? perheenjäsenen kaverin työtoverin
 En

10. Onko kodissasi tietokone?

- kyllä ei Jos kyllä, niin millainen _____

11. Käytätkö tietokonetta säännöllisesti?

- kyllä ei

Jos kyllä, niin montako tuntia viikossa? _____ tuntia

12. Aiotaanko perheeseesi hankkia tietokone?

- kyllä ei

13. Käytätkö tietokonetta a) työssäsi, b) opiskeluissasi c) vapaa-aikanasi?

- a) kyllä ei
b) kyllä ei
c) kyllä ei

14. Onko sinulla jokin sairaus tai vamma, joka hankaloittaa GSM-puhelimen tai tietokoneen käyttöä?

- kyllä ei

Jos kyllä, niin kuvailetko lyhyesti, miten haitta ilmenee tai vaikuttaa laitteen käyttöön?

15. Tiedätkö mikä on navigointilaitte?

- kyllä en

16. Jos tiedät, niin oletko joskus käyttänyt navigointilaitetta?

- kyllä en

17. Omistatko navigointilaitteen? kyllä en

Kiitos vastauksestasi!