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Secondary User Requirements Report – Expert Survey

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Abstract

For the European AAL-JP-project FEARLESS a multi-cultural expert survey was conducted in Austria, Catalonia (Spain), Germany and Italy. A total of 22 telecare professionals from profit and non-profit organizations were either interviewed or filled in a standardized questionnaire. The sample comprises telecare professionals, professional care givers, and entrepreneurs in the field of telecare. Across different health-care systems and individual areas of expertise five requirements for an innovative ambient event detector could be identified: Data protection, usability, accreditation, personnel expenditure, and affordability.

Keyword List

telecare, multi-cultural expert survey, ambient event detector, fall detection, fire detection, elderly

DOCUMENT CHANGE LOG

Document Issue	Date	Reasons for Change
Version 1 Draft 1	25th Oct 2011	Initial version
Version 1 Draft 2	28th Oct 2011	Results of literature research included
Version 1	31st Oct 2011	Minor changes
Version 2 Draft 1	24th Feb 2012	Results for primary users and relatives from Catalonia (Spain), Germany and Italy available Preliminary results for Austria available
Version 2	22nd May 2012	Final results for primary users and relatives from Austria available
Supplement for Version 2	29th Oct 2012	Results for telecare professionals available

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LIST OF ABBREVIATIONS

AAL	Ambient Assisted Living
ACT	Advanced Care Technologies
COG	CogVis GmbH
CVL	Vienna University of Technology
e.g.	for example
etc.	and so on
i.e.	that is
INF	InfoKom GmbH
IPK	Fraunhofer IPK
I2C	i2CAT Technological Center
LIN	Linkcare Health Services
MED	Medical University of Vienna
n	number of participants
n.s.	not specified
PSY	University of Bamberg
QCA	qualitative content analysis
R&D	research and development
s.	see
SAM	Samariterbund Vienna
SME	small and medium-sized enterprise
TES	TeSAN
TV	television
UNA	user needs analysis
WP	work package

1. INTRODUCTION

In this document we report the most recent results of a multi-cultural expert survey which was conducted in the course of WP1. On the basis of this survey data we would like to give answers to the following questions:

- What telecare technology do care providers currently use?
- For what purpose do care providers use these telecare devices?
- Which functions should a new ambient event detector provide in order to meet the needs and expectations of care professionals?
- Which aspects of a new telecare system are critical for success?

For this purpose quantitative and qualitative data was collected from 22 experts in Austria, Catalonia (Spain), Germany, and Italy. The sample comprises telecare professionals, professional care givers, and entrepreneurs in the field of telecare. Across different health-care systems and individual areas of expertise five requirements for an innovative ambient event detector could be identified: Data protection, usability, accreditation, personnel expenditure, and affordability.

Initially we would like to thank our partners in Austria, Catalonia (Spain), and Italy for their great efforts in conducting and facilitating this study. Thanks are also due to the experts who readily participated in this survey. Last but not least we thank our interns and student researchers at the Department of General Psychology and Methodology of the University of Bamberg (PSY) for their great dedication to this challenging endeavour.

Guidance for stressed readers: At the end of each section you will find a blue box titled *"How do these findings relate to the aims of the FEARLESS project?"* providing concrete project-related ideas and suggestions that have been derived from the survey data.

2. METHODOLOGY

In this section we outline the methodology of our multi-cultural expert survey, by describing its *target group* and the methods used for *data acquisition* and *data analysis*.

Target group. The target group of this study is very heterogeneous. It comprises a wide range of professions and different types of organisations (e.g. profit versus non-profit organisations). Not to mention the differences between national health-care systems. Of course a small expert sample can only reflect a fraction of this diversity. The composition of our expert sample takes three basic dimensions into consideration: (A) It captures a strategic (e.g. entrepreneurs and researchers from the field of ACT) and an operational perspective (e.g. care givers) on innovative telecare. (B) It reflects differences between profit and non-profit organizations, and (C) it includes small, medium-sized as well as large organisations.

Data acquisition. A special UNA-questionnaire for experts and a standardized interview guide were designed by psychologists from the University of Bamberg (PSY). The content of the expert questionnaire and the interview guide are shown in TABLE 1.

Content of the Expert Questionnaire	Content of the Interview Guide
Personal Data	Personal Data
Area of Expertise	Professional Career
Organizational Aspects	Corporate Profile
Current Telecare Technology	Currently Used Telecare System
Technical Requirements	Deficits of The Current Telecare System
Client Profile	Expectations Towards New Telecare Technology
Questions and Suggestions	Typical Client Profile
	Questions and Suggestions

Table 1: Content of the expert questionnaire and the interview guide

The original expert questionnaire was designed in English. Subsequently the English version was translated into Catalan, Italian, Spanish, and German.

Except for Italy response rates were generally low. In Austria SAM sent cover letters to different care organizations without getting any answers. In Catalonia I2C tried to arrange for interviews but also with little success. In Italy 10 experts answered the questionnaire. In Germany PSY conducted 7 expert interviews.

Data analysis. The expert questionnaires contain different types of items: open questions (e.g. item CT09) and items with predefined answers such as rating scales (e.g. item CT07) or a multiple choice format (e.g. item OR02). These different item formats produce different types of data, which require different methods of data analysis.

Open questions produce written statements. For the analysis of this verbal data the method of Qualitative Content Analysis (QCA) by Mayring (2007) was used. This method allows for a strictly rule-based categorization of content and requires a well-defined set of categories. The development of these categories can either be driven by a theory ("top-down") or be derived from the verbal material itself ("bottom-up"). For this expert survey we chose a bottom-up approach: content categories were extracted directly from the verbal data in order to reflect an unbiased expert perspective. Quantitative data produced by multiple-choice items and ratings was processed and visualized using Excel 2010 (descriptive analysis, graphs).

Of course the available expert data (n=22) cannot reflect the entire diversity of national health care systems, organizations (e.g. profit versus non-profit) and individual areas of expertise. In accordance with Mieg and Näf (2005) a systematic comparison of single case studies was conducted in order to identify commonalities. For the sake of vividness we directly quote individual statements in the report (e.g. "*Accreditation is an important issue.*" (Expert statement)).

Please note: The available expert data (n=22) cannot reflect the entire diversity of different national health care systems, organisations (e.g. profit versus non-profit) and individual areas of expertise within the field of telecare. A systematic comparison following the approach of Mieg and Näf (2005) was conducted to identify commonalities among expert statements.

3. SECONDARY USERS – EXPERTS

3.1 EXPERT SAMPLE

The expert sample includes 22 care professionals from Austria (n=3), Catalonia (Spain) (n=2), Italy (n=10) and Germany (n=7).

Organisational aspects. The experts who participated in our survey worked for small and medium-sized enterprises (SME) as well as large health care organisations. Among these organisations the number of employees ranged from 15 to 1,500. In sum 13 experts were employed by non-profit, 8 worked for profit organisations, and 1 person was affiliated with a research organisation.

Individual expertise. Tenure of experts ranged from 3 to 34 years. We assume that all experts have reached a sufficiently high level of professional experience.

Item EX01: What is your profession? The following Figure 1 shows the distribution of experts across different fields of expertise.

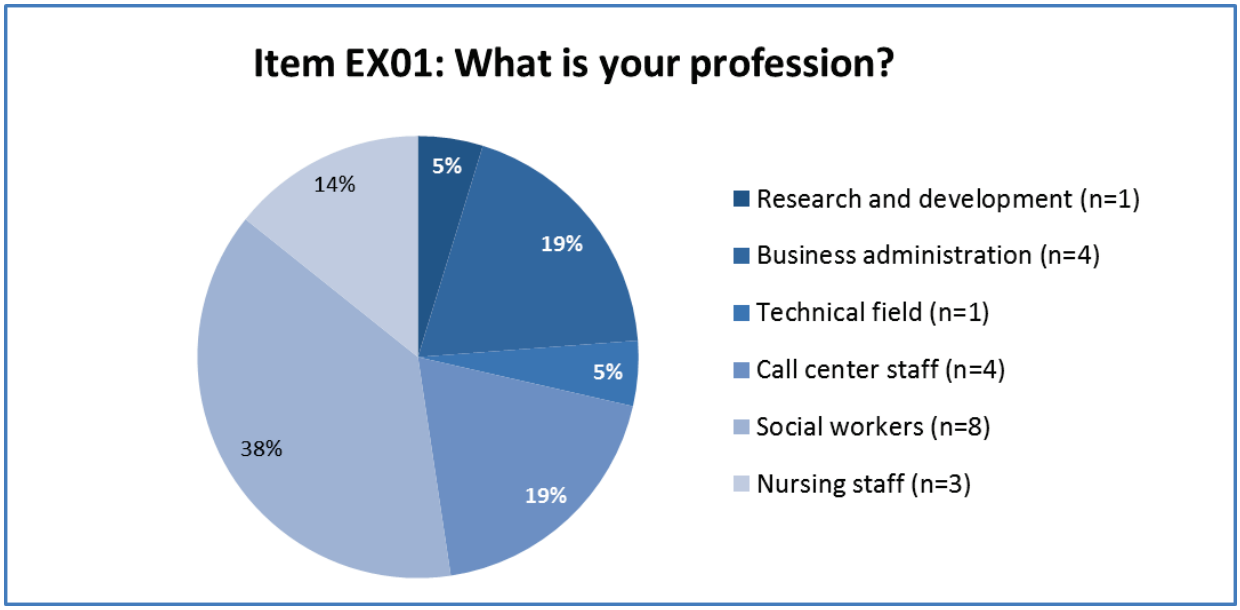

Figure 1: Distribution of professions among experts

Item CR05: What kind of services does your organisation offer? The organisations offer a wide range of care services. Important for FEARLESS could be the fact, that a majority of organisations provide a 24/7 stand-by service. The point "other" stands for the additional services like assisted living, emergency transport, patient transfer as well as employee and lay training. These four services are offered by nearly all of the Austrian and German organisations. A unique combination of telemedicine, R&D as well as consulting was only provided by one Italian organisation and one German organisation. The total number of clients using these services differs greatly between the questioned organisations: It ranges from 10 to 35,000 (!) people, depending on the size of the organisation. 95-100% of their clients use telecare services. Three organisations from Germany reported the lowest rate of telecare clients (83%, 75% and 14%).

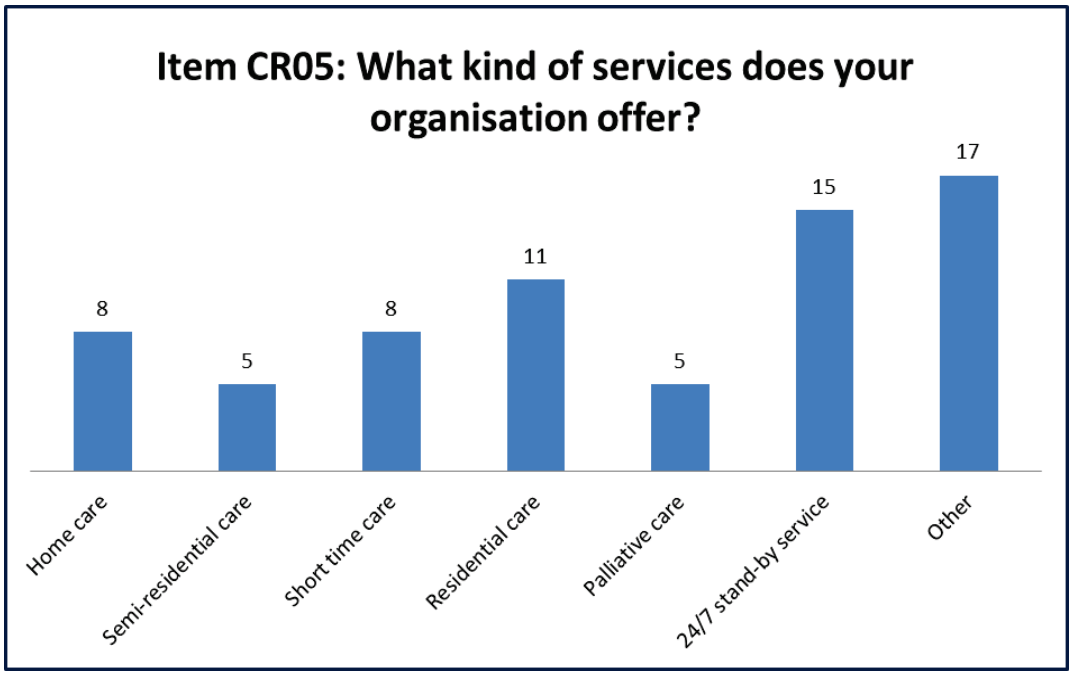

Figure 2: Portfolio of services

CR07: For what kind of care are the telecare devices used? Telecare technology is already applied to a wide variety of care services: Almost all organisations use telecare devices for ambulant care and assisted living. The portfolio of three German organisations comprised up to six different services including telecare devices. It seems that an ambient event detector that is easy to install and which covers a wide variety of everyday risks (e.g. fall detection) could be applied to a great variety of existing services.

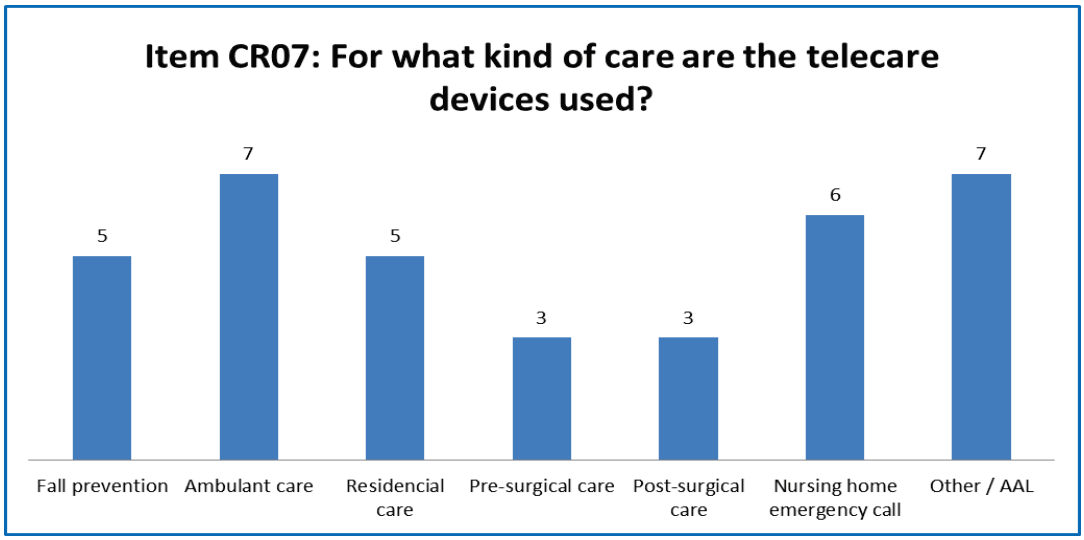

Figure 3: Care services using telecare technology

3.2 CURRENT TELECARE TECHNOLOGY

Item CT02: Which (combination of) sensors do you apply for detecting critical events? Twelve organisations are currently using a panic button for detecting critical events. These panic buttons are often combined with separate sensors for smoke (7), gas (7), and motion detection (7). These most widely-used sensors are followed by bio-feedback sensors that are worn on the body (3), heat sensors (2) and floor sensors (2). Apart from these predefined sensor categories one organization is currently using a special fall detector and a video-conference system for the detection of critical events.

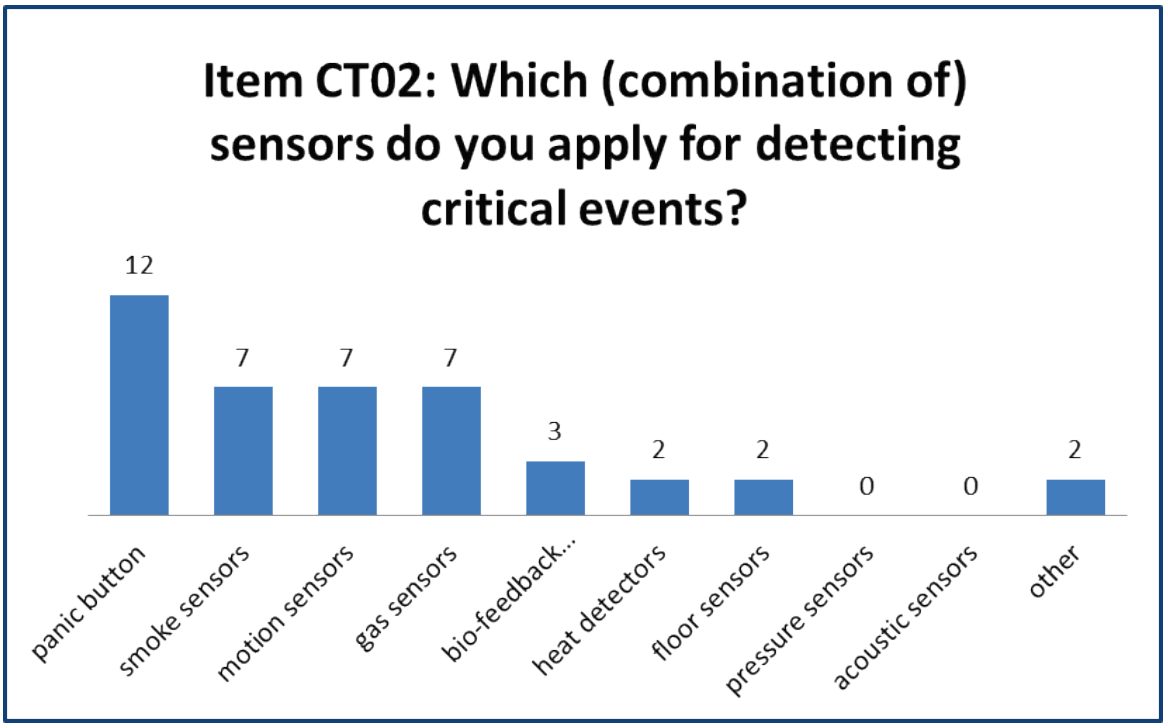

Figure 4: Sensors used for detecting critical events

Item CT09: Please describe the standard procedure after an alarm has been raised. A great majority of organizations use a panic button. The clients wear it around their neck or wrist. In case of an emergency they release an alarm by pressing it. Only one organisation uses a telecare system with an automatic alarm but also one does not use any alarm mechanism. In most cases the client releases the alarm by pressing the emergency (panic) button (n=12). The standard procedure after an alarm takes place as follows:

- After an alarm has been raised the client is contacted by an employee of an call centre
- If the client asks for help, the appropriate helper will be sent
- If there is no contact to the client, the rescue facility will be sent.

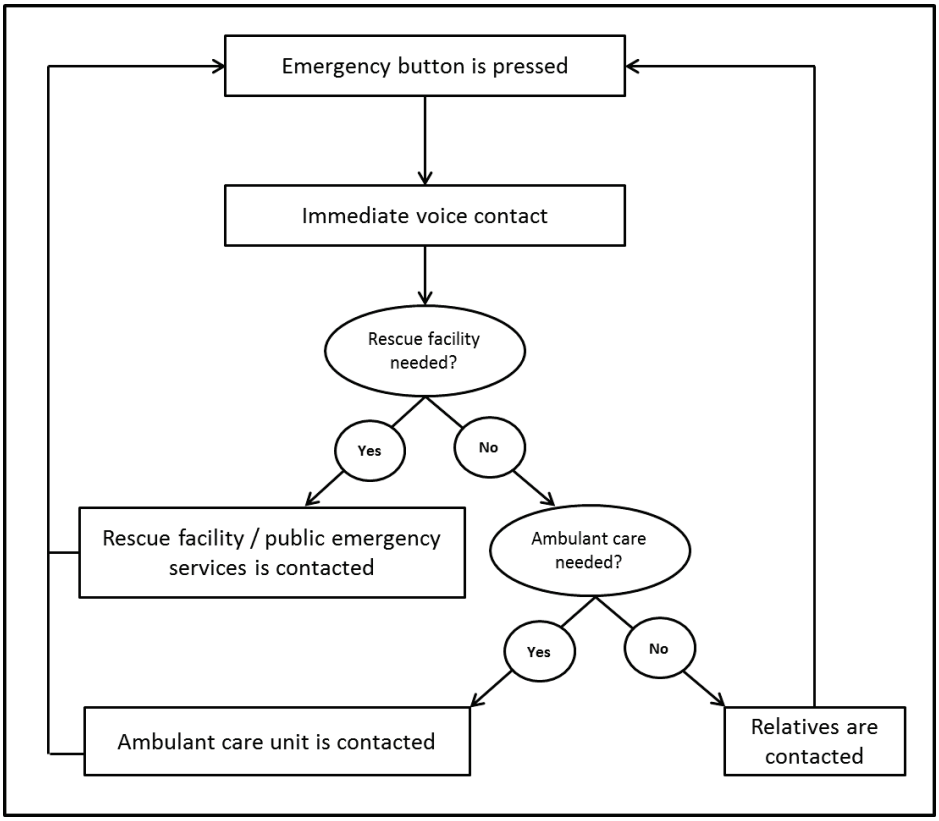

Figure 5: Standard procedure after an alarm has been raised

3.3 PREFERRED FUNCTIONS

Item TR06: Which functions should an innovative telecare system provide? By far the most preferred function among telecare professional was fall detection followed by gas detection, inactivity monitoring, and fire/smoke detection (s. FIGURE 6 and TABLE 3). Alike primary users and their relatives, a considerable number of telecare professionals would opt for a device which provides fall detection indoors and outdoors. The option "other" accounts for desired features apart from the predefined options given in the UNA-questionnaire:

- "*permanent domestic fall-risk-detection*" (Expert statement),
- "*fall detection, locating and navigation outside the home"* (Expert statement),
- "*mobile system with high-precision GPS-locating, an open secure (encrypting) communication protocol, triggering an alarm via voice recognition e. g. code word*" (Expert statement)

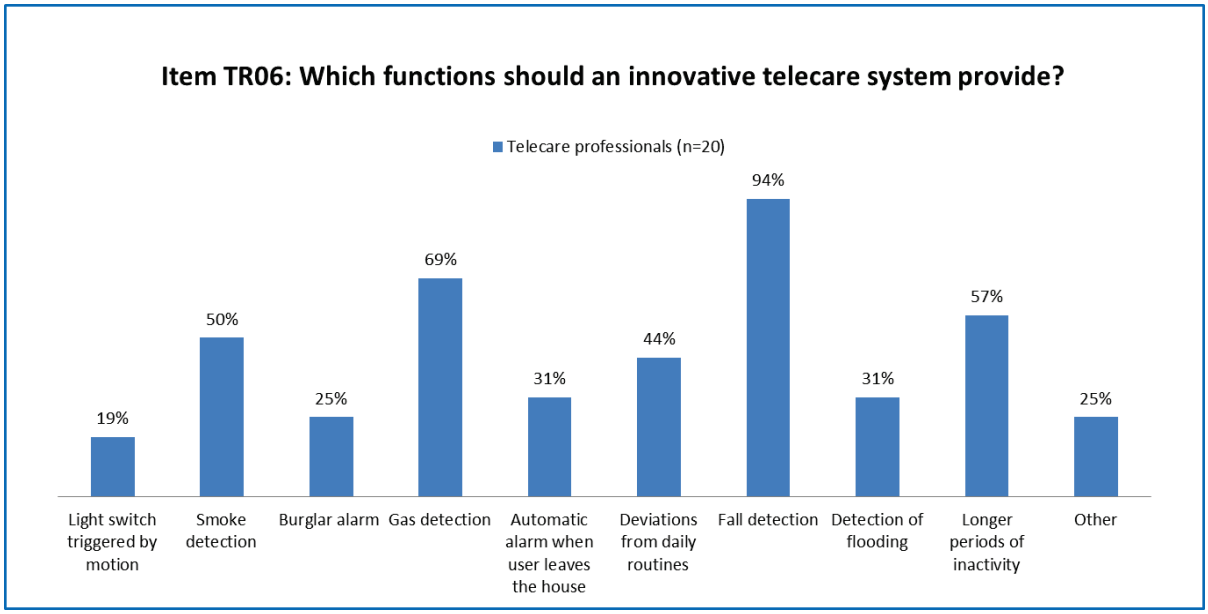

Figure 6: Sensors used for detecting critical events

	Austria		Catalonia		Germany		Italy		Telecare professionals
	Elderly	Relatives	Elderly	Relatives	Elderly	Relatives	Elderly	Relatives	
Fall detection	**X**	**X**	**X**	**X**	(x)	(x)	**X**	**XX**	**XX**
Inactivity monitoring			**X**	**X**	(x)	(x)			**X**
Fire detection	**X**	**X**	**XX**	**X**	**X**	(x)		**X**	**X**
Burglar alarm			**XX**	**X**	(x)		**X**	**X**	
Flooding			**X**	**X**					
Gas detection			**X**	**X**			**X**	**X**	**X**
Monitoring of daily routines			**X**	**X**					
Light triggered by motion	**X**				(x)				

(x) = functions appreciated by at least 30% (only applied to German samples)

X = functions appreciated by at least 50%

XX = functions appreciated by at least 70%

Table 2: Preferred functions of primary users, relatives and telecare professionals

3.4 CRITICAL FACTORS

Which aspects of a new telecare system are critical for success? For telecare providers from Austria and Germany a reasonable **employee-to-client-ratio** is crucial. Ideally this means that the FEARLESS-system allows for a given staff to care for a greater number of clients without any additional efforts. In Germany the demand for care personnel surged after alternative military service was abolished in 2011.[1] As a result personnel expenditure is a critical factor for German telecare providers:

„In Munich we are competing with many other care providers for trained and certified carers. We receive requests from elderly people and their relatives on a daily basis. It's a pity, but as long as we lack qualified carers we cannot expand our business to meet these requests." (Expert statement)

How do these findings relate to the aims of the FEARLESS project? At least for Germany a great shortage of qualified care personnel was reported. Also for the sake of labour costs operating the FEARLESS-system should be less labour intensive than conventional telecare systems (e.g. panic button).

The ambient event detector must…

- ✓ **Not require additional care personnel**
- ✓ **Not require intensive training** or a high level of specialization

Besides personnel expenditure, **pricing and accreditation** are cardinal factors:

"In Lower Franconia the panic button is sold for 30 to 35 Euros while elsewhere it costs 35 to 50 Euros per month. […] people are stingy and so are their relatives. If the doctor doesn't say that you have to have it. The aim has to be that the panic button becomes an officially recognized assistive device." (Expert statement)

According to telecare professionals from Austria the monthly costs for services, which are related to the panic button, range from 18€ to 23€. In Germany the costs for corresponding services range from 30 € to 50€. Italian experts estimated the monthly costs for these services between 15€ and 18€.[2]

[1] In Austria there are also plans to abolish military service including alternative military service.

[2] Unfortunately there is no corresponding data available for Catalonia (Spain).

How do these findings relate to the aims of the FEARLESS project? In order to allow for reimbursement – and thus for a better affordability – the FEARLESS-system should be certified as an assistive device.

The ambient event detector should…

- ✓ **Be officially certified as an assistive technology**
- ✓ **Allow for reimbursement** (e.g. by health insurance companies)

Yet another factor is important: **providing information for the right age group.**

„At the age of 75 they [potential primary users] *contact us and seek for information. The most important topics are: Inheritance matters, patient's provision and assistance at home respectively panic buttons. […] By the age of 80 the demand for panic buttons surges." (Expert statement)*

Having crossed the Rubicon, clients hardly ever change the technology or the telecare provider.

How do these findings relate to the aims of the FEARLESS project? Information material and marketing activities should be tailored to people aged between 75 and 80 years as well as their relatives and trusted persons. Remember: Once they have made up their mind they hardly ever switch technologies or telecare providers.

Some questions of the UNA-questionnaire targeted **usability and reliability aspects** such as expectations towards reliability in terms of false alarms. In the UNA-questionnaire we provided the following definition: A false alarm is an alarm, that has been released either intentionally or accidentally but does not indicate a case of emergency.

Item TR11: Using a panic button, please estimate the percentages of false alarms. With this question we wanted to find out how experts appraise the reliability of the most widely-used telecare device: the panic button. Experts were asked to estimate the percentage of false alarms of a panic button. The estimations ranged from "less than 10%" to "between 80% and 90%" (!).

Item TR12: A system without false alarms is desirable but not realistic. Which percentage of false alarms would be acceptable for you? In our next question we asked for the acceptance of false alarms in future telecare systems. FIGURE 6 shows that a majority would accept less than 20% of false alarms (s. FIGURE 6).

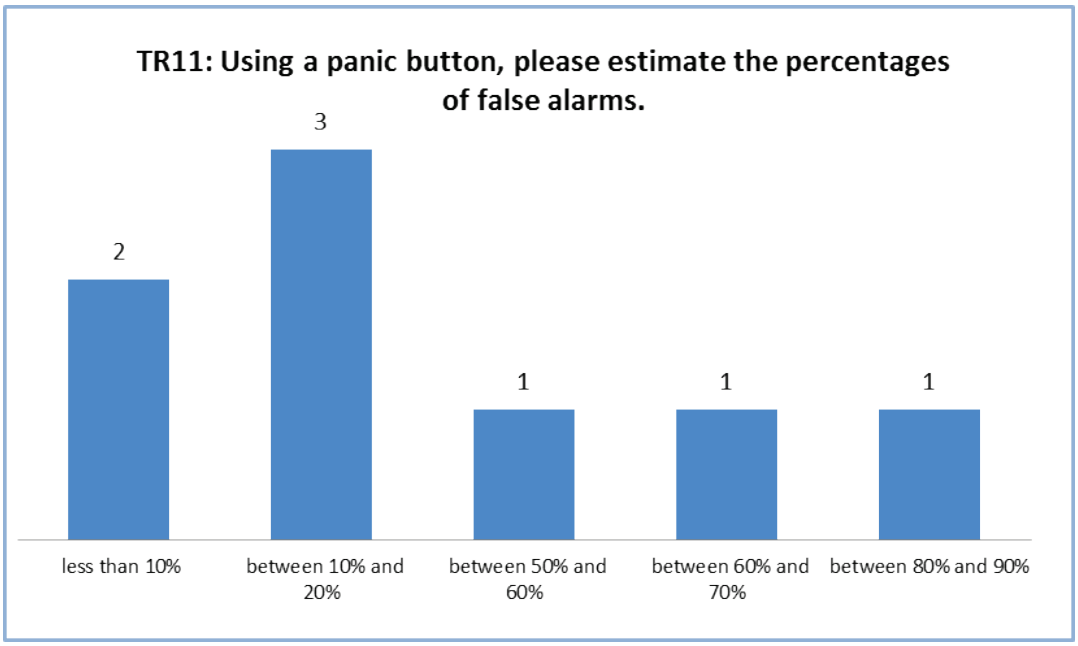

Figure 7: Percentage of false alarms using a panic button

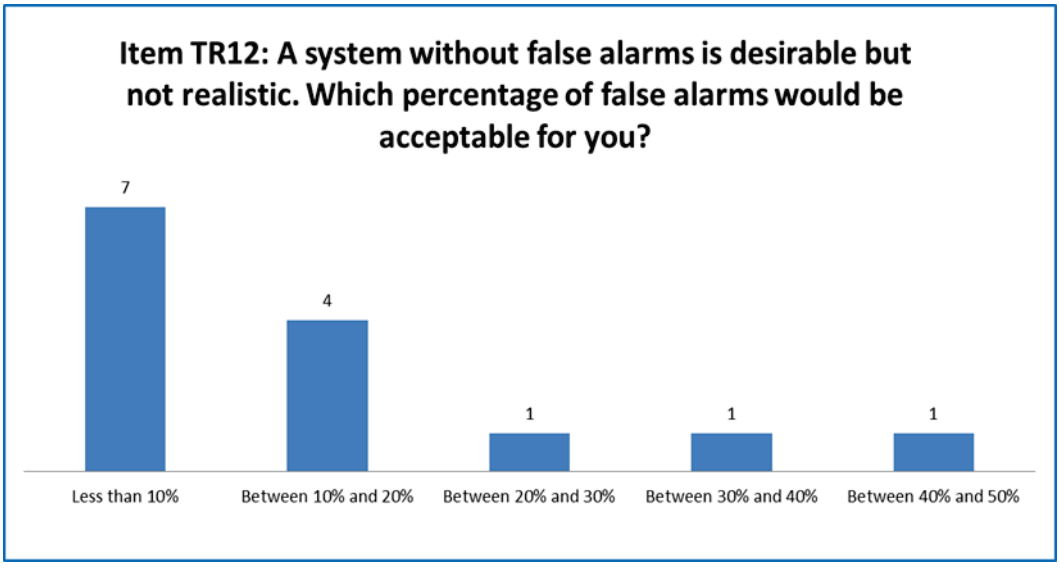

Figure 8: Acceptable percentage of false alarms

Talking about false alarms we would like to quote an extraordinary expert statement:

"*Our rate of false alarms is close to zero, because no alarm is seen as a false alarm – every alarm reflects a user's need.*" (Expert statement)

Obviously telecare professionals are very well aware of the fact that they provide a lot more than emergency aid: their call centre staff also offers social support. A vast majority of "false alarms" are raised by telecare clients who press their panic button simply because they are looking for someone to talk. Although there is no apparent emergency (e.g. a fall) these "false alarms" reflect feelings of social isolation or boredom and have to be taken seriously. Automated risk detection limits direct communication between clients and call centre staff. This is certainly beneficial for telecare providers in terms of labour intensity (s. personnel expenditure). However, from a primary end user point of view this may be considered as a drawback of the FEARLESS-system.

How do these findings relate to the aims of the FEARLESS project? Of course usability is essential. The FEARLESS-system has to be reliable and easy to handle. Both aspects are closely related to personnel expenditure: if the FEARLESS-system proves to detect falls and fires reliably it relieves rescue staff. If it is easy to handle it will require neither intensive training nor a high level of specialisation.

The ambient event detector should…

- ✓ **Detect falls, inactivity, and fires reliably** (e.g. few false positives / negatives)
- ✓ **Display relevant information comprehensibly** (e.g. current status of a client)
- ✓ **Allow for feedback from the client** (e.g. cancellation of a false alarm)

Last but certainly not least, **privacy and data protection** are essential: A telecare system which is not compliant with European or national data protection laws is not ready for the market. Yet in a user requirement analysis such aspects can easily be overlooked: Privacy and data protection issues were hardly ever raised by our interview partners simply because they were taken for granted. For the sake of completeness we added data protection to our set of requirements.

How do these findings relate to the aims of the FEARLESS project? Undoubtedly the FEARLESS-system has to be compliant with national and European data protection laws. Besides usability this is the most basic prerequisite for accreditation and market access in the first place.

The ambient event detector should…

- ✓ **Be compliant with national and European data protection laws**

4. SUMMARY

For the European AAL-JP-project FEARLESS a multi-cultural expert survey was conducted in Austria, Catalonia (Spain), Germany, and Italy. A total of 22 care professionals from profit and non-profit organisations responded to our survey. They answered questions about their individual area of expertise, organisational aspects, typical client profiles, the current telecare technology used, and their expectations towards novel telecare systems. Participants were also asked to specify preferred functions and pricing for a custom-tailored ambient event detector. Quantitative and qualitative research methods were applied to identify a set of five additional requirements (s. FIGURE 8): Data protection, usability, accreditation, low personnel expenditure, and affordability.

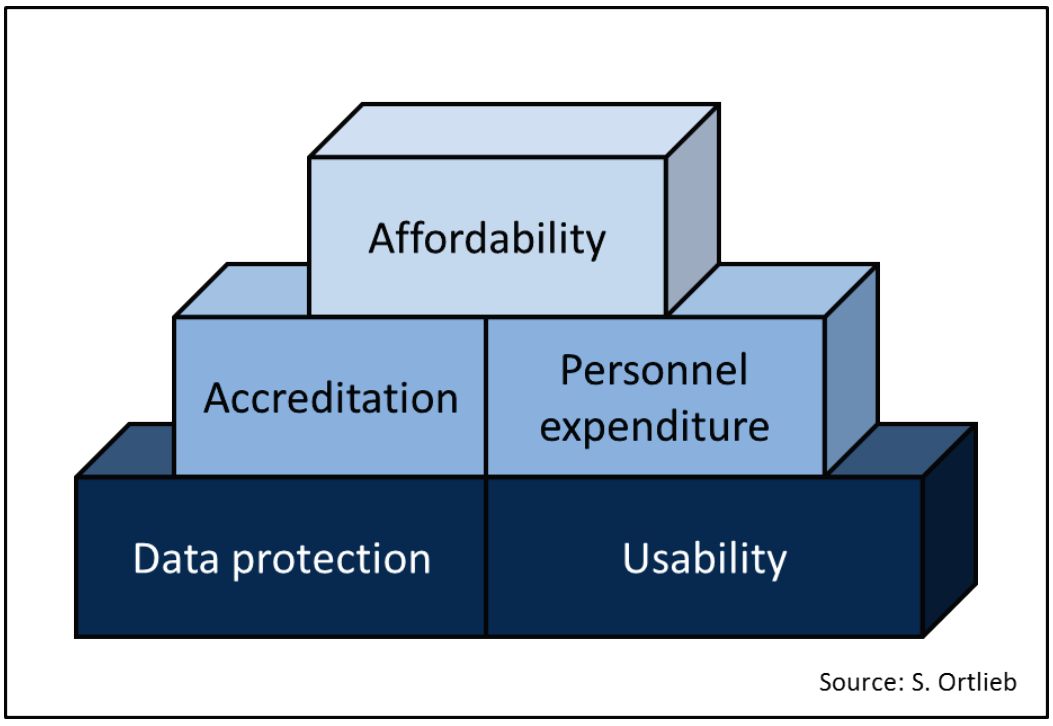

Figure 9: Requirements from the telecare professionals' point of view

5. CHECKLIST

Secondary user requirements	The projected ambient event detector should…	How do we account for this requirement?
Privacy and data protection	✓ **Be compliant with national and European data protection laws**	…… ……
Usability	✓ **Detect falls, inactivity, and fires reliably** (e.g. few false positives / negatives) ✓ **Display relevant information comprehensibly** (e.g. current status of a client) ✓ **Allow for feedback from the client** (e.g. cancellation of a false alarm)	…… ……
Personnel expenditure	✓ **Not require intensive training** or a high level of specialisation ✓ **Not require additional care personnel**	…… ……
Accreditation	✓ **Be officially certified as an assistive technology** ✓ **Allow for reimbursement** (e.g. by health insurance companies)	…… ……
Affordability	✓ **Be competitive** in terms of price	……

6. REFERENCES

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