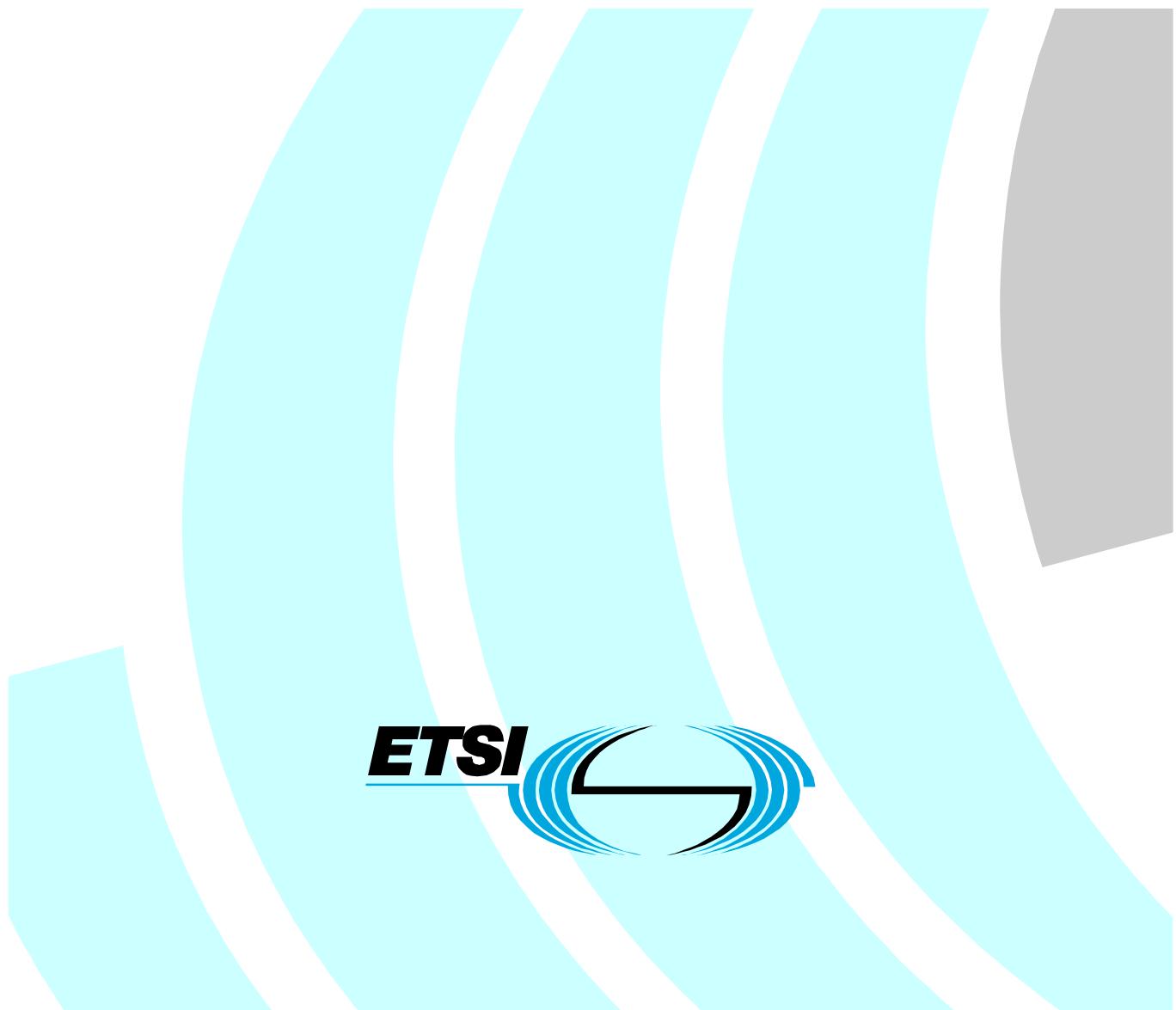Final draft **ETSI EG 202 301** V1.1.1 (2004-03)

**Universal Communications Identifier (UCI);
Using UCI to enhance communications for
disabled, young and elderly people**

Reference

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Foreword

This ETSI Guide (EG) has been produced by ETSI Technical Committee Human Factors (HF), and is now submitted for the ETSI standards Membership Approval Procedure.

Introduction

User requirements for Universal Communication Identification (UCI) based services were discussed and specified in EG 201 940 [2]. The technical implications of implementing these user Requirements were reported in EG 202 067 [3]. The impact of UCI systems in improving the usability of communications has been described in ETSI Technical Report TR 103 077 [8]. One specific area of usability identified in TR 103 077 [8] has been the consideration of features of UCI systems which might be used to improve communications both for people with various functional impairments (e.g. people with different disabilities and some elderly people) and also for young people (up to 12 years of age). Recommendations on how to ensure that UCI is usable for all users are described in EG 202 249 [4].

A comprehensive set of barriers to effective communications for disabled, young and elderly people was reported in TR 103 073 [7]. These were derived from an interview and questionnaire process with a representative sample of stakeholders. Priorities for the different communication issues were elicited from the various user groups consulted.

The current document has started with the communication issues and requirements raised by the groups consulted in the production of TR 103 073 [7] and presents a series of recommendations relating to:

- the ways in which the basic capabilities of UCIs and their supporting systems, when introduced, would meet most of the communication requirements of the target groups;

- the ways in which UCIs and their supporting systems could be used to provide new, or improve current, solutions to the specific communication difficulties raised by the target groups;

- how and where provision of additional system capabilities might be necessary, in addition to the availability of UCI systems, to address other issues.

In addition, important issues that are outside the scope of UCI are highlighted in Annex C.

Implementation of the recommendations listed in the current document will address many, if not most, of the issues raised in the consultative phase of the work, thus enhancing the diversity, security and quality of communications for elderly, young and disabled people.

1 Scope

The present document presents recommendations that address the issues identified in TR 103 073 [7] which identified communications issues experienced by people with disabilities, elderly people and young people up to 12 years of age. The recommendations concentrate on the ways that the UCI additional information field and PUA functionality can be used to enhance the communication experience of these groups of users.

The document is targeted at UCI developers and in addition provides information for:

- Groups representing elderly, young and disabled people.

- Service Providers.

- Telecommunications Regulators.

- Terminal equipment providers.

2 References

The following documents contain provisions which, through reference in this text, constitute provisions of the present document.

- References are either specific (identified by date of publication and/or edition number or version number) or non-specific.

- For a specific reference, subsequent revisions do not apply.

- For a non-specific reference, the latest version applies.

Referenced documents which are not found to be publicly available in the expected location might be found at http://docbox.etsi.org/Reference.

[1]   ETSI EG 201 472: "Human Factors (HF); Usability evaluation for the design of telecommunication systems, services and terminals".

[2]   ETSI EG 201 940: "Human Factors (HF); User identification solutions in converging networks".

[3]   ETSI EG 202 067: "Universal Communications Identifier (UCI); System framework".

[4]   ETSI EG 202 249: "Universal Communications Identifier (UCI); Guidelines on the usability of UCI based systems".

[5]   ETSI ETR 329 (ed.1 (1996-12)): "Human Factors (HF); Guidelines for procedures and announcements in Stored Voice Services (SVS) and Universal Personal Telecommunication (UPT)".

[6]   ETSI TR 102 133: "Human Factors (HF); Access to ICT by young people: issues and guidelines".

[7]   ETSI TR 103 073: "Universal Communications Identifier (UCI); Improving communications for disabled, young and elderly people".

[8]   ETSI TR 103 077: "Universal Communications Identifier (UCI); Maximizing the usability of UCI based systems".

[9]   Dulude, Louise (2002). "Automated telephone answering systems and aging". Behaviour and Information Technology (Vol. 21, No 3, 171-184).

[10]   Katz et al (1997). "Public attitudes to towards voice-based electronic messaging technologies in the United States: a national survey of opinions about voice response units and telephone answering machines". Behaviour and Information Technology (Vol. 16, No. 3, 125-144).

3 Definitions and abbreviations

3.1 Definitions

For the purposes of the present document, the following terms and definitions apply:

assistive device: any item, piece of equipment or product system whether acquired commercially off the shelf, modified or customized that is used to increase or improve functional capabilities of individuals with disabilities

> NOTE: Americans with Disabilities Act definition.

chat room: area on the Internet where two or more people can have a typed conversation in real time

spam: flooding the Internet with many copies of the same message, in an attempt to force the message on people who would not otherwise choose to receive it

> NOTE: Also used to describe the messages that have been sent in this way.

spoofing: pretending to be someone else

timeout: setting that automatically cancels a step in a user-system dialogue after a certain period of time

trusted third party: independent, unbiased third party that contributes to the ultimate security and trustworthiness of any transaction

virus: self-replicating program that is hidden in another piece of computer code, such as an email

worm: computer program, which replicates itself and is self-propagating

3.2 Abbreviations

For the purposes of the present document, the following abbreviations apply:

CLI	Calling Line Identification
GPS	Global Positioning Service
ICT	Information and Communications Technology
ISDN	Integrated Services Digital Network
ISP	Internet service provider
IVR	Interactive Voice Response
PUA	Personal User Agent
SA	Service Agent
SMS	Short Message Service
UCI	Universal Communications Identifier

4 Background

4.1 Benefits of UCI with evolving network architectures

Implementation of UCI systems as proposed in EG 201 940 [2] and EG 202 067 [3] will overcome the many limitations that arise from the identifiers currently used in today's communications systems. When the UCI is used within a supporting network architecture it will:

- identify the user, rather than the terminal or service;

- avoid the need to have many different identifiers for a range of different communications services;

- provide the potential for verifying the true identity of the originator or recipient of a communication;.

- remain unchanged when moving to a different service provider or service type;

- provide a common environment for the management and control of all personal communications irrespective of service type (as opposed to a range of different control mechanisms that are service specific);

- allow user profiles to be set up to provide comprehensive management of outgoing and incoming communications;

- ensure that any special requirements are automatically catered for with both incoming and outgoing communications.

For the user these features bring many benefits related to:

- Trust: Everybody's UCI label and number will be registered with a "trusted" authority and, under normal circumstances, only the UCI owner will be able to use it. So, when UCI users receive calls or communications from other UCI users, they can trust that that the communications are really coming from the right people.

- Stability: UCI users do not need to tell everybody when they get new or replacement communications services from different providers. Their UCIs always remain the same.

- Security: For added security, it will be possible to request positive verification of the source of a communication.

- Special Requirements: The additional information field can be used to let communication networks and people know about any special requirements UCI users may have. For instance, a UCI could specify that the user can speak English and German but only read German.

- Simplified Communications: UCI is a single personal identifier used for all types of communication service. Therefore, when an email is received from someone with a UCI, the same identifier can be used to call that person back on the telephone. Also, instead of having to search for all the identifiers a person may have, it will only be necessary to look for one.

- Automatic Address Book: When UCI users are contacted by other UCI users, they will have an opportunity to automatically add the UCI to their address books. When a UCI user acquires a new device or service there will be no need for anybody to update their address books. The same address book information can be accessed from any terminal.

- Incoming Communications: Rules can automatically be applied to incoming communication from a UCI user, because the identity of the person is known. For example, one rule could say that after 10pm only calls from members of the family will be accepted. There could be many rules that cover many eventualities, including, for instance, diverting calls to users, wherever they are.

- Outgoing Communications: The requirements of both the originator and receiver of a communication are taken into account by the system, so that the chances of establishing communication acceptable to both parties will be improved.

The fundamental generic user requirements for communications systems that these features address are listed in Annex A.

In a UCI system, every user has at least one UCI each with an associated Personal User Agent (PUA). For every service used, the user has an associated Service Agent (SA). This is described below.

4.1.1   Universal Communications Identifier (UCI)

The UCI is a single, unique identifier for a user. It consists of an alphanumeric part, a numeric part and an additional information field (not directly seen by those making or receiving communication). It is only the numeric part of the UCI that is unique and hence it is this that uniquely identifies the user. The UCI would be allocated by a trusted authority and be stable, i.e. it would not change over time even with a change of service provider.

e.g. John Smith[8837460633789]<a6;f1;d234;k78>

Some of the key characteristics of the UCI are:

- it is a unique identifier for a person, role or organization;

- it allows a "user-friendly" name to be used as a label which describes the originator and/or recipient of a communication;

- it allows important additional information to be available to anybody using it such as preferred media, acceptable languages, whether business/personal, label authenticity or alias, etc;

- it allows the originator or recipient of a communication to claim authenticity for their identifier;

- where it is particularly important to verify the claimed authenticity, additional procedures can be invoked to make sure that it is not another person accidentally or intentionally making use of the UCI;

- it is independent of services and networks;

- it is independent of service providers.

4.1.2   Personal User Agent (PUA)

A PUA is an entity external to the main communication networks and with a one-to-one relationship to a specific UCI. It stores, or has access to, information on all of a user"s communication services and their service identifiers (e.g. telephone numbers, email addresses, etc.). The PUA also stores, or has access to, current state and personal preferences information in relation to all communications services. These preferences (or user profile) would consist of access, filtering and redirection rules which could operate on a wide range of factors including:

- the identity (UCI) of people attempting to communicate with the user or with whom the user is trying to communicate;

- the date and time when communication is attempted;

- the location of the user;

- the urgency of the communication;

- whether the originator of a communication has a business or a personal status;

- the user"s preferences for how they wish to be reached (which services and which terminals) or how they wish to contact others.

The operation of these rules can permit a very high degree of control over the user"s communications. EG 201 940 [2] gives some scenarios illustrating the potential power and flexibility of UCI-based communication. Further, more detailed, examples and scenarios are given in EG 202 067 [3].

4.1.3   Service Agent (SA)

An SA is an interface between a PUA and a communication service (or network). It would typically be provided by a network or service provider. An SA is the link between the main UCI system and networks and services. It communicates with PUAs, other SAs and its own network/service and would be specially trusted by PUAs following successful registration.

4.2 UCI in operation

The originator requests a voice call to the target user:
A   Each PUA exchanges information with the SAs of it is user's networks/services before, during and after
         communication attempts take place. The target user's PUA knows that the user's mobile phone is able to
         receive voice calls.
1   The originating user enters the UCI of the target user.
2   The originating PUA makes a request to the PUA of the target user.
3   The PUAs negotiate communication options if necessary.
4   The target user's PUA takes account of it's user's preferences and proposes the user's mobile phone to
         receive the call.
5   The originator's PUA instructs the originator's network to set-up the call.
6   A voice call between the originator's ISDN phone and the target user's mobile phone is established.

Figure 1: Simplified overview of UCI operation

4.3 Some UCI benefits relevant to disabled, elderly and young people

The first benefit of UCI is that, instead of connecting a terminal with another terminal, a UCI system is aware of the identity of both originator and recipient. It is therefore possible for the system to be aware of special requirements that either originator or recipient (or both) may have. This could result in specific terminals, services or networks being used to set up the communication or the automatic invocation of network based services.

The second is that the UCIs "additional information field" can also highlight special requirements relating to the UCI holder. This field carries information which can be placed in the address book of anyone with whom its user communicates. These special requirements can be presented to the originator of a communication before they attempt connection. This allows them to take special measures to ensure successful communication. The special requirements alluded to above could be almost anything that will help the originator in setting up a successful communication.

Finally, it will be possible, when using UCI systems, to present an "authorized" and trustworthy delivery label with each communication. This means that the recipient can be confident that the communication is from the person or organization that it claims to be from.

The purpose of the current study has been to investigate how these system capabilities map onto the requirements of the various groups consulted.

5   Important communication issues identified

The issues in this clause have emerged from examining the comments made in the interviews and the results obtained from the questionnaires described in TR 103 073 [7]. The sub-clauses in this clause are derived from the clauses in TR 103 073 [7].

5.1   Requirements focus

A very strong message arising from the study was that when trying to optimize communications, the focus should be on the requirements of the individual and not their age or their disability. Listing a specific disability or age might encourage someone to assume that the person would prefer a specific form of communication, where they might have a strong preference for a less obvious form of communication (e.g. a blind user might have a strong preference for email (with a text to speech converter), whereas many people might assume that their preference would be for speech-based communications).

A user"s preferred communication service cannot be derived from a description of a disability that the user has or from their age. For this reason, PUAs should not use the "disability" element in the "Additional Information Field" to decide what communications service the user would prefer. Instead, the "communication preference" element should be used.

The user profile held by the PUA would normally be pre-configured with a set of default settings. Users would then be free to modify these settings to suit their individual needs.

Recommendation 1.1: Requirements focus
The user's preferred communication services should be determined from the "communication preference" element and not from any "disability" or "date of birth" element of the additional information field.

5.2   Accessibility

A person with disabilities will normally have chosen terminal features and settings, or be using their own assistive devices, in order to facilitate communication with others e.g. text readers, speech amplification. However, these may not be easily transportable and might only be used at home or work. Facilities need to be available to help people with disabilities when they are away from their normal environment e.g. visiting family or friends, in a hotel room, or on holiday.

Systems and services have to be accessible before they can be used. A design for all approach should be followed to overcome some of the problems of accessibility for elderly and young people and people with disabilities. For these target groups, accessibility to communications systems and services is the priority, before any usability issues can be addressed.

Recommendation 2.1: Assistive device unavailability
In the initial set-up of their PUA, UCI users should be provided with a dialogue that enables them to specify under what circumstances they will be unable to use their chosen terminal features, settings and assistive devices.

Recommendation 2.2: Alternatives to assistive devices
In the initial set-up phase, PUAs should offer a set of options for alternative ways to handle communications when users do not have their chosen terminal features, settings and assistive devices available.

Recommendation 2.3: User interface configuration
Terminals or services that have the ability to configure a user interface to a user"s needs (e.g. enlarged text or voice amplification) should automatically request a UCI user"s personal preferences from their PUA. The terminal or service should attempt to meet these preferences.

5.3   Usability

A number of questions on the questionnaire were specifically aimed at finding more information in relation to the ease of use of communications.

5.3.1   Simplicity

A number of groups such as cognitive impaired people, children, elderly mentally infirm people and novice users would benefit from simplicity. This can take several forms:

- Set-up options: where options could be provided that range from the system choosing how to configure all user settings to the user having full control of these settings.

- Limited functionality: many users may have no need for some of the functions that a UCI system is able to offer, so packages of functionality could be provided that range from a small core subset to the full range of possible features.

- Presentation of information: different users will have different levels of understanding of complex communication concepts. Most users will benefit from quite simple presentation and this should be the default option - with access to more detailed levels of information being user selectable.

> **Recommendation 3.1: Simplicity**
> PUA providers should provide simplified set-up options, packages of functionality ranging from basic to comprehensive and simple presentation of information as the default.

5.3.2   Initiating a call

Initiating a call by lifting a handset is really only a problem for some people with physical disabilities who do not have access to appropriate assistive devices. UCI is unlikely to directly help in resolving such difficulties. Hands free communication could be of benefit here.

5.3.3   Performing the sequence of steps required to make a call

This was not generally felt to be any more of a problem for our target groups than for the general population. Exceptions to this may be very young people, very old people, or people with physical or cognitive impairments. However, any systems that aid these groups would be of benefit to all, e.g. voice activated dialling, etc.

Where a person"s disability or lack of maturity may make it difficult to follow a sequence of dialogue steps, the PUA could assist users by prompting them about the next step to take (this would also be useful for novice users). Some users may find that they need assistance in the sequences of steps needed to set-up a call or register or de-register their presence at a remote telephone or terminal.

> **Recommendation 3.2: Sequential dialogue assistance**
> A process in which the PUA leads the UCI user through a sequence of dialogue steps should be made available. This could be provided to the user by default, on request or if the PUA detects that the user is having difficulties.

5.3.4   Ending a call

There are currently two main ways of ending a call:

1)   to replace the receiver; and

2)   to press an "end call" key.

Ending a call was not highlighted as a problem for any of the groups, although the very young may not realize the consequences of "hanging up" a call and some very elderly people might simply forget to end the call. There is also a situation where a telephone handset may be incorrectly replaced causing it to fail to terminate the call.

> **Recommendation 3.3: Assisted call termination**
> Although it would not be desirable for a PUA to attempt to automatically terminate a communication, it could contact the user by one of the other means to which the user has access. It could then inform the user of the possible need to terminate the original communication.

5.3.5   Accurately dialling telephone numbers

This was an issue particularly for the very young, the cognitive impaired and those with certain types of physical impairment.

Systems that provide the facility to automatically dial a stored number would be helpful here. Systems that allow the user to compose the number offline before it is sent will also be beneficial to many of these users.

For those who have slow response times, the timeouts on a system can be a problem. Where services and applications allow for variable timeouts, the PUA can request that longer timeouts are provided.

Recommendation 3.4: System timeouts
Where the user profile indicates that longer timeouts are required, or where the PUA detects that timeouts are becoming a problem, then the PUA should request that they are provided when technically possible.

5.3.6   Handling of communication identifiers

At present the commonest form of communication identifier is the telephone number and the survey identified handling them as a problem. However, many of the handling issues also apply to other forms of communication identifier such as email addresses.

Being able to remember telephone numbers is a memory issue so may be more of a problem for cognitive impaired, very old people and very young children. Many systems currently have features available such as short code dialling which can help with this. However, there may be a downside to this type of help. When one is constantly using speed dialling one forgets the original number. Children may not develop this type of memory if they are not being required to remember numbers.

In addition, there is the issue of different number formats being used on different networks. There leads to a problem of transfer of knowledge from one system to another.

The skill of looking up communication identifiers in address books and directories requires a certain amount of literacy. Consequently, very young children, the cognitive impaired and blind people without the use of assistive devices may have problems doing this. Presenting the information in different media, e.g. by using photographs or voice labels to the information could make the search task very much easier.

As well as needing the ability to look up information in an address book, there is the issue of updating the information and whether this should be done manually or automatically. There is a current trend away from hard copy address books/directories to electronic ones. The issues with electronic address books/directories may not be the same as those for paper versions.

The master list of contacts held by the PUA provides the means for all users to initiate communications with known recipients. In order that every user is able to fully exploit the benefits of the list of contacts, they must be able to access the contacts within the list. Lists of names may be appropriate for many users, but alternative options should be available to suit the needs of users who are unable or unwilling to use written lists. People with certain types of brain damage and pre-literate children would benefit from photographs and/or voice labels for the various contacts.

Recommendation 3.5: Alternative contact list labelling
PUA providers should be encouraged to support alternative means of labelling entries in contact lists. Support for the inclusion of photographs and voice labels should be provided.

Recommendation 3.6: Support for labelling elements of the "additional information field"
 PUAs should be able to recognize the "additional information field" elements for photographs and voice labels, even if the contact lists do not provide support for storing these.

5.3.7   Needing reassurance

This only appeared to be an issue for very young children, who may not have performed some operations on a regular basis, and for some elderly people who can be fearful of new technology. In conclusion it is a person's confidence level which will determine whether they need reassurance or not.

Elderly people also have a preference for human assistance if available.

Recommendation 3.7: Confirmation of user actions

Where a user is known to lack confidence the PUA could provide various stages of confirmation of user actions. These could include:

- a confirmation of the action that the user has taken (what the system believes the user has done);
- an indication of whether the action that the use has taken is what the system required ("correct") or not what was required ("incorrect");
- an indication of what corrective action the user should take to correct for any error or omission made.

Recommendation 3.8: Level of confirmation feedback

Users should be allowed to indicate the level of confirmatory feedback that they require.

5.3.8   Participating in an effective conversation

From responses received it was obvious that respondents had assumed that reference was being made to traditional voice conversations, as it was seen as only a problem for deaf and hard of hearing people. Therefore offering communication in different media would solve many problems here. PUAs have the ability to investigate different options for providing a communication that suits both parties to the communication. Normally the PUA would assume that every service that the UCI user has available is one that they are very able and willing to use. This may not be the case for some members of the target groups who may only be able to use some services under special conditions. The PUA will need to know these conditions and the user"s preferences if it is to provide an effective communications environment for the user.

Recommendation 3.9: Preferred means of communication

Every opportunity should be taken to make it easy for users in the target groups to indicate to the PUA both the means of communication that they prefer and those means of communication available to them that they find very difficult or impossible to use.

5.3.9   Using interactive voice response (IVR) systems

Many services currently use automation that presents the caller with a spoken list of options to choose from, with an associated number needing to be pressed to make the selection. These types of dialogues can be a problem for deaf and hard of hearing people, and are a problem for many elderly people. This finding is consistent with a comparison between US residents [10] which showed that elderly respondents found IVR systems less satisfying than their younger counterparts and that they performed less well with them. Almost all elderly participants in another study [9] admitted that they always, or almost always, choose the option that connects them to a live operator, as did a quarter of the young participants.

Many people would be helped by an automatic connection to human help if errors are being made. The option to select human help should also be easily provided. The length of the list of options can be an issue. An ETSI report on stored voice services (ETR 329 [5]) recommends "a maximum of four unrelated context dependent choices" in voice menus.

Recommendation 2.3 identifies the way in which UCI enables services to be configured to suit a user"s special requirements. For IVR systems, the setting of shorter voice menus could be a very valuable option for users with very short memory span. Also, where users frequently revisit the same menus destinations in an IVR system, they would benefit from support to rapidly go to these frequently accessed destinations.

Recommendation 3.10: Access to human help

Providers of interactive voice response systems should provide a means of access to a human help facility that can be invoked automatically by a PUA where appropriate.

Recommendation 3.11: Alternative voice menus

The providers of voice response systems should provide the option of menus with fewer options per menu that can be invoked if a UCI user's PUA requests it.

Recommendation 3.12: Bookmarking menu items

PUAs should provide a bookmarking facility that enables the user to store the means of accessing important or regularly used voice menu destinations. This would allow users to go straight to the areas of greatest interest to them.

5.4 Privacy and trust

In the initial interviews, some of the most frequently raised issues related to personal privacy and trust. The range of privacy issues raised included people's willingness to reveal personal data such as age, nature of their disability, etc. As a result of this, a number of questions in the questionnaire probed these issues in more depth.

Young children, people with cognitive impairments and many elderly people were seen as being particularly vulnerable because of varying degrees of naivety. This vulnerability results in many potential dangers. These could be real physical danger such as from paedophiles or criminals, nuisance from spam and sales calls or financial implications arising from invitations to use premium rate services. These areas were consistently cited in the interviews and in the questionnaire responses.

In the specification of UCI (EG 202 067 [3]), the concept of the "authentic name" was introduced. This relies on a trusted third-party verifying that the user is entitled to use the specified name and certifying the relationship between the person and the name. In clause 5.4.1, the concept of authentic date of birth is introduced. The expectation is that an analogous process would be used to verify that the date of birth given is appropriate to the UCI owner. The "authentic date of birth" element of the additional information field enables a person's true age to be determined for use in circumstances such as online purchasing of senior-citizen discounted products.

5.4.1 Exposing vulnerability

Interviewees representing all groups expressed concerns that members of their group were potentially vulnerable when communicating. For example, elderly people and people with physical disabilities felt vulnerable to burglary from people who had discovered during a telephone call that they were alone.

However, results suggest that many elderly people are not concerned about revealing their age when communicating, indeed many are proud of their age and tend to broadcast it. Also many people with disabilities are happy to expose the nature of their disability if they see that by doing so it would make the communication easier.

Our results supported the view that children tend to be unaware of the potential dangers of revealing their age. The tendency to reveal age information inappropriately is related to their prior exposure to safety advice.

In conclusion, exposing information on age or impairments under the right circumstances can lead to improved communications but in the wrong circumstances it may also lead to potentially threatening situations. People who use UCIs may have a lot of sensitive information stored on their behalf to assist them in managing their communications. The requirement is for assistance from the system to determine when it may be appropriate to disclose any of this sensitive information to others.

Recommendation 4.1: Confidentiality
PUA providers should reassure users that information stored in their PUAs will only ever be released with the explicit agreement of the UCI user or to appropriate authorities in an emergency.

Recommendation 4.2: Authentic date of birth
The PUA provider should provide the capabilities for storing the UCI user"s authentic date of birth. The PUA should be able to verify the "authentic date of birth" element of another UCI user's additional information field.

NOTE: The "authentic date of birth" element would normally only be checked by services and not by individual users.

Recommendation 4.3: Privacy of additional information field data
PUAs should have rules that specify what additional information field elements the UCI user wishes to be supplied to other people during communications or directory searches and they should be made aware of the choices that have been made. The user should be provided with an easy mechanism for formulating these rules.

During PUA to PUA negotiation, a PUA may request information contained in elements of the additional information field. PUAs must provide rules that allow the user to specify what information may or may not be released to another PUA. These rules could specify that permission to release is always granted or always denied. However an "ask me" option can be provided to allow the user to make a case-by-case decision when the circumstances for release are difficult to specify.

Recommendation 4.4: **Prompting for release of information**
Set-ups that frequently prompt the user to allow or disallow release of information should be avoided wherever possible. Such prompts could cause particular concern and difficulties for groups such as cognitive impaired people, children and elderly mentally infirm people.

Recommendation 4.5: Override of information release
PUA providers should provide the capability to allow parents or guardians to override or constrain a user's ability to release potentially sensitive and dangerous information (e.g. their age or infirmity).

    NOTE: The circumstances under which parents or guardians lose the right to have such control may be a matter of national or regional law.

5.4.2   Allowing public access to communications identifiers

Public access to information about a person is frequently provided by public directories and other listings. When that information should be made available and what information should be contained were issues that were often mentioned during the study. The predominant message that arose when looking at elderly people and people with disabilities was that the decision on whether to have their details listed in a directory was a matter of personal choice and not normally influenced by their age and disability. The one significant exception to this was that people who were hard of hearing, deaf, or deafblind were more reluctant to be listed in directories. This appears to be associated with the difficulty in dealing with the unsolicited calls that might result from such a listing.

With regard to children, many parents/guardians are afraid of public listings that reveal their children's age. This is due to the fear that revealing such information would expose them to unwanted communications from a variety of sources ranging from toy marketing campaigns to paedophiles. Education and publicity was seen as an important factor in whether or not parents were sufficiently aware.

Currently, contact information is either fully public (e.g. listing in a directory) or fully private (e.g. unlisted). UCI provides more flexible ways of allowing access to the names and contact details of people that still protects their right to accept or reject unwanted communications.

Recommendation 4.6: Use of UCI-based directory services
People from the target groups should be encouraged to use the more flexible and powerful protection provided by UCI-based directory services. The wide range of options available are documented in EG 202 067 [3].

Recommendation 4.7: Restriction of access to children's directory details
The providers of directory services should try to provide options whereby access to a child's contact details is:
- restricted to a known list of trusted individuals;
- restricted to other children of a similar age (identified by means of inspection of the authentic date of birth information held by the child's PUA;
- subject to the agreement of the child's parents (who would typically have PUA management rights).

5.4.3   Avoiding unwanted communications

The problem of how to control or filter incoming communications is one that affects everybody almost without exception. The proliferation of unsolicited sales calls on the telephone and "spam" on email can be a nuisance for most people but for some groups it can cause stress and even inhibit use of the communications medium.

Respondents confirmed that this is a real problem for many of the groups. Many children and elderly people cannot differentiate between a genuine communication and a sales pitch. On this particular issue they could be considered naïve. Blind people can find spam particularly irritating because it is awkward to scan an incoming message list with a text reader.

Spam filters are available for email but they suffer from many limitations. Because of the ease with which identities are falsified, spam filters cannot rely heavily on the claimed identity of the sender in filtering incoming mail. As a result, attempts to filter spam can lead to cases of wanted messages from known people being rejected and unwanted messages being accepted. Also, if their use is to closely match a user's needs, the spam filtering system will itself impose a management overhead of its own.

The only way currently to identify an incoming telephone call is by means of Calling Line Identification (CLI). This is of limited use in that it provides a terminal identifier which may or may not be known to the receiver of the communication. In addition, there are many circumstances in which legitimate and useful CLI information is not passed to the receiving terminal. Some of the target groups did use CLI to screen calls, in the absence of any alternative, and found it of some use. Sometimes, when available, a human "filter" can act as a sophisticated mechanism for identifying and filtering callers.

An additional problem is emails that carry computer viruses and worms. Anti-virus software is an important tool in countering these threats, but inspection of incoming message address fields is still an important method to help to detect suspicious and potentially damaging emails. This provides real problems for some users from the target groups who may find it difficult or impossible to study and analyse the address field information sufficiently rigorously.

Many of the difficulties and fears that members of the target groups experience relate to uncertainties about whether the apparent identity of the people trying to communicate with them can be trusted (due to fears about spoofing of identities, worms, etc.). If members of the groups had access to communication facilities where identity could be trusted, it would be much easier for them to be sure that they were communicating with people that they wanted to communicate with and that they were not being pestered or threatened by strangers.

UCI-based systems provide a very powerful way of filtering incoming communications based upon knowledge of trusted identities (rather than the current need to filter on identities like email addresses that cannot be trusted).

Recommendations 4.8: Reducing unwanted communications

Users who are concerned about unsolicited communications should be encouraged to only accept communications from people or organizations that use a UCI. For some very vulnerable groups it may be advantageous to filter incoming communications to only allow those from UCIs in their address book.

NOTE: Such filtering should significantly reduce the amount of spam received and hence reduce the great difficulty that many blind people have in scanning long lists of messages to sort the genuine email from the spam.

5.4.4   Dealing with sensitive communications

Everybody, at times, needs to make communications which are sensitive in nature such as financial or romantic calls. Where an intermediary is involved in helping someone set-up or undertake communications, the privacy required for such a communication is compromised.

NOTE: Current relay services usually have strict privacy policies, but this is clearly not sufficient to remove the embarrassment experienced by some respondents.

Recommendation 4.9: Sensitive communications

Because UCI allows the user to select the required service on a call-by-call basis, a UCI user should be provided with the means to easily select an automated relay service when engaging in sensitive communications and use their preference for a relay service with a human intermediary for all other communications. The choice of when to use an automated service could be determined by which UCI was being called or was calling or manually selected on a one-off basis.

NOTE: Fully automated relay services do not currently exist but such services are being developed.

5.5   Control of communications set-up

5.5.1   Initial set-up

Many communication systems are now becoming very complicated and as such need to be set-up before they can be used. This can be a problem for all people and especially for some of the target groups (in particular blind and cognitive impaired people and very young children).

One issue raised in many of the interviews was the importance of the system needing to be set-up to suit the needs of specific groups. For example, people with some disabilities require an option to select the media for sending and receiving communications and for receiving feedback.

Dialogues that are very complicated can be a problem for young children and the cognitive impaired who do not necessarily possess the appropriate skills (e.g. literacy skills) to be able to interact with the system. This is a situation which would require assistance from a third-party.

To address the above issues, there is a requirement for:

- user profiles pre-configured to suit the needs of specific groups;

- third-party assistance (from a parent/guardian, from a service provider, from a organization representing one of the target groups, etc.);

- settings for novice and expert users so that once familiar with the system short cuts can be taken (a standard UCI feature);

- equivalent settings in different services being presented to the user in a standardized manner (a standard UCI feature).

Recommendation 5.1: Pre-configured user profiles

A range of different "off-the-shelf" user profiles, specially configured to suit the communication needs of various segments of the target groups, should be made available to members of the target groups or their carers/parents. These could be provided by Service Providers, organizations representing the target groups, etc.

NOTE: This is analogous to the way that various ISPs already make special "child-friendly" internet accounts available.

Recommendation 5.2: Third-party assistance

Organizations and service providers should be encouraged to provide personal assistance tailored to the needs of specific groups of users.

NOTE: This could include face-to-face support, telephone help-lines and internet based support.

5.5.2   Delegation of control

Most UCI users will have the benefit of being able to exercise full control of their personal communications set-up and use. However, in certain situations, such personal control may be inappropriate or unfeasible. Examples are young children and cognitively impaired adults with no literacy skills or those whose impairments severely restrict the range of tasks that they can perform, even with appropriate assistive technology.

As soon as another party becomes involved in managing a person's communication that party will have the ability to modify how and to whom the person can communicate. The more complex the management of communications becomes, the more dependant the person will be on being helped in the management tasks. However, the use of others in helping to set-up systems is already common in the field of the set-up of people's computer systems.

Some respondents have gone so far as to say that there always needs to be some mechanism to ensure that somebody whose communications are being managed by a parent/carer can communicate any abuse of that responsibility to an appropriate person.

Many of the issues related to the control of another person's communications can be seen as basic human rights issues and may therefore be subject to relevant national human rights legislation.

Recommendation 5.3: Appropriate use of delegated control

Carefully defined safeguards need to be in place to ensure that, where another person has any degree of delegation of control over a UCI user's usage and management, this control is appropriate to the circumstances. The safeguards also need to ensure that the delegated control cannot be abused.

5.5.3   Adapting to changing user requirements

One of the basic assumptions of UCI is that users will be given the facilities to allow them to adapt the behaviour of their PUA to suit their changing needs. In addition, it is also suggested that a PUA could notify a user of the possible advantages if some of their existing rules or settings were to be amended.

In the case of elderly people or people whose disability becomes more severe over time, an issue will be at what point they require assistance. Sometimes the person may be unaware or unwilling to admit that they require assistance. These groups would potentially benefit from proposed changes suggested by the PUA.

In the case of children, parental control over communication is likely to be essential for very young children and the need for it will diminish as the children mature. In some countries, legislation may specify an age at which a parent may no longer have control over their children's communications. The simpler the system is to use, the more likely it is for the person to be able to manage their own communications. This simplicity could be inherent in the system or because simpler options have been set up by a third party.

As UCI-based systems are involved in every aspect of a user setting-up and making a communication, they can become aware of difficulties that a user appears to be experiencing (e.g. frequently being timed-out of various services).

Recommendation 5.4: PUA initiated assistance
The PUAs should offer UCI users, or their carers, options that could help them overcome difficulties that they appear to be experiencing (e.g. offering to automatically select the "connect to human operator" option if the user is always being timed out of voice menus in a system).

5.6   Making a communication

5.6.1   Being aware of the financial implications of a communication

There was a significant concern expressed by respondents to the questionnaire and in the initial interviews concerning the targeting of children and other vulnerable groups with regard to premium rate calls. A topical example cited several times was a recent television program in which people (principally children and teenagers because of the subject matter) were invited to telephone and register a vote for their favourite pop idol. Another example was a telephone number sent by SMS which purported to put the person called in touch with an unclaimed prize (by ringing a premium rate number).

The use of premium rate communications is a legitimate commercial practice which in most cases provides a service acceptable to its users. The results of the study suggest that a significant requirement of future systems is to ensure that those who may be financially naïve or in some other way unable to understand the way in which these communications are charged, are protected from excessive and unexpected costs.

Recommendation 6.1: Provision of communication cost information
UCI-based systems should acquire whatever costing information is available from network and service providers so that users can be given a clear picture of how a communication will be charged. In this way, vulnerable users would be able to be protected from excessive and unexpected costs.

   NOTE: UCI users will be able to set thresholds in their PUA that determine when and how they wish costing
                  information to be presented.

Recommendation 6.2: Control of communication based on cost
Rules that either bar communications or limit their cost, using available costing information, is another UCI feature that would be of particular benefit to some of the target groups.

5.6.2   Making urgent communications to a partner/carer/parent

Comments from many of the respondents suggested that current communications systems have limitations when members of their groups need to take urgent action or respond to an emergency situation.

Of all the issues raised in the questionnaires related to children and elderly people, the responses in the questionnaire suggest that maintaining the capability of communication with a partner/carer/parent is one of the most important.

There will inevitably be circumstances where an elderly, disabled or young person has urgent need to communicate with their carer or parent. Only email currently offers the facility of labelling a communication "urgent" but, not being a real-time service, its use in a truly "urgent" situation is limited. Text based telephony is far more likely to be used by those unable to use speech but can still be a slow process. In most cases a real-time voice based communication will be required.

Many facilities already exist to enable the speed-dialling of a small subset of commonly used identifiers ranging from dedicated buttons to single button transmitting devices which can be carried or worn at all times. Single button alarms work well where the called party is a monitoring service which is constantly manned. But in other circumstances where the person being called may not be at the particular terminal specified or is already using that terminal for another communication it could be difficult to establish a communication. In some countries call waiting identification is available as an additional service but it is only possible to receive such indications on special terminals and the service has technical limitations. If the carer or parent is physically away from the terminal specified then there is little that can be done except for the person trying to contact them to attempt alternative numbers.

It is clear that many of the target groups would greatly benefit from any mechanisms that improves the prospects of urgent communications getting through to carers/parents etc. They would need mechanisms that would not be defeated by such everyday events as the carer/parent, etc, being away from home or engaged in another communication.

> **Recommendation 6.3: Making urgent communications**
> Levels of priority can be assigned to any communication in UCI-based systems. All communications between UCI users and their partners/carers/parents which have been assigned a high priority should be treated in such a way that they take precedence over all other communications.

5.6.3   Providing a reminder and reassurance call facility

One of the topics raised frequently at the interviews was the need to keep a regular check on somebody's state or whereabouts. This could be so that the caller could find out their location (raised frequently for children and for elderly people suffering from dementia) or because of the need to issue regular reminders ("have you locked all the doors?")

Many useful services which could be provided by future communications services were proposed during the interviews.

- Keeping track of children. Knowing where they are or if they have strayed from an agreed location.

- Knowing if elderly parents were "wandering".

- Checking on an elderly parent on a regular basis i.e. ringing to see if they were OK several times per day.

- Reminding an elderly person to check that all the gas taps on a cooker were turned off every night.

To some extent these suggestions could be considered as outside the realm of a communication system and more relevant to an electronic personal organizer or specialized GPS based service. However future communication systems will "know" to a reasonable degree of accuracy, the location of the user (mobile phones as an example would pinpoint a user's location to a particular "cell"). They may also have a detailed "understanding" of the needs of their user and it would therefore be a simple step to build into the system rules which stimulated simple reminder and check calls when its user travelled to "unexpected" locations. These check calls could be to the user or to another nominated individual such as a parent or carer.

> **Recommendation 6.4: Keeping track of vulnerable users**
> PUA providers should provide a facility whereby an alerting call can be made when a vulnerable user has travelled to an "unexpected" location (e.g. a person suffering from dementia would not be expected to be wandering outside their house at night). These check calls could be to a nominated individual such as a parent or carer.
>
> NOTE: This facility relies on the availability of reliable information on a UCI user's location which is increasingly likely to be available to a PUA from a number of sources.

5.7   Contacting the emergency services

Comments from many of the respondents suggested that current communications systems have limitations when members of their groups need to take urgent action or respond to an emergency situation.

A call to the emergency services is likely to be time critical. In addition, the difference between a call to the emergency services and an urgent call described in clause 5.6.2 is that the recipient of the call (an emergency services operator) has little or no knowledge of the caller. This means that, after initial connection, the operator must engage in a question and answer procedure to elicit vital information such as the caller's name, their location, nature of emergency, etc. To minimize the total reaction time, both the dial time and the information elicitation need to be minimized.

The speed dialling capabilities of special terminals enable emergency numbers to be selected quickly and accurately. But other devices such as most mobile terminals do not usually have any form of emergency or "panic" button. Numbers must either be keyed or selected from the "phonebook".

There are special text based emergency services available for deaf people in some countries with an associated special emergency number (18000 in the UK). In the UK a call to this number is responded to even if no text input is forthcoming. Such terminals are not usually mobile and this could be very restrictive in many emergency situations (e.g. house fire, car accident).

Despite the special training of the operators, it can be difficult to elicit important information from anybody contacting an emergency service. The person may be in a state of distress or shock and be incoherent. If the person calling is a very young panicking child, somebody with a severe cognitive impairment, somebody who is hard of hearing or profoundly deaf, or an elderly person with advanced dementia, then the problem of extracting important, critical information could increase significantly. An important requirement for future communications systems appears to be the automatic presentation of relevant details to an emergency operator without the need for time consuming questions and answers. Information relating to the age or any disabilities of the caller could then be used to direct the call to a specialist operator when appropriate. In some circumstances the information presented, if it included home address or current GPS location, could be comprehensive enough to allow the automatic dispatch of an emergency service once the nature of the emergency had been ascertained.

In UCI, the PUA can hold a lot of personal information about a UCI user. This would frequently include name, age, address, disability description, types of communication that the user can use and current location (either from GPS data or the user's current mobile phone cell location). This information would normally be highly protected and only ever released to another party with the explicit agreement of the UCI user.

Recommendation 7.1: Emergency service access to PUA data

Emergency services should be given unique rights to access information contained in a UCI user's PUA without the permission of the UCI user.

> NOTE: This would enable presentation of relevant details to an operator without the need for time consuming questions and answers. In some circumstances the information presented, if it included home address or current GPS location, could be comprehensive enough to allow the automatic dispatch of an emergency service once the nature of the emergency had been ascertained.

Recommendation 7.2: Automatic assignment of specialist emergency operator

Emergency services should provide a facility to direct an emergency call to a specialist operator depending on the information relating to the age or any disabilities of the caller. Such information would be obtained from a UCI user's PUA (see Recommendation 7.1).

5.8   Safe communications for children

Respondents in the consultation showed concern about the "grooming" of children by paedophiles in chat rooms and this confirmed the findings of TR 102 133 [6] on access to ICT by young people. UCI offers perhaps the most powerful solution to this very serious and topical threat. A previous UCI document (EG 202 067 [3]) identified the need for an "authentic label" as a way to show that the name a person uses when communicating is certified by a trusted authority as a name the person is entitled to use (e.g. the name on their birth certificate or passport). The "authentic date of birth" additional information field element of a UCI could be certified when the trusted authority certifies the "authentic label" element. Whereas the "authentic label" would be visible during normal communications, the "authentic date of birth" would not be.

Anyone who wanted to run a totally safe internet chat room for children could set and advertise a specified maximum age for participation. They would then place three requirements on those joining the chat room:

- all participants would be required to use a UCI;

- all participants would be required to allow the "authentic date of birth" element of their UCIs additional information field to be checked when subscribing to the chat room;

- participants would be asked to use an "alias" name and not their "authentic label" in order to protect their true identity.

A UCI and a publicly viewable privacy policy would be associated with the chat room application to ensure that the chat room itself was not gathering age information for illicit use.

Children who had a UCI would, if they were aware of the potential danger, also be able to challenge other UCI users contacting them by email, instant messaging or the telephone to ask them to prove that they were the age that they claimed to be. This process would involve the child's PUA checking the "authentic date of birth" element of the other person's additional information field. For privacy reasons, the other person would always retain the right to refuse such a challenge, but doing so would be likely to greatly increase any suspicions that the child (or the child's parents) already had.

Recommendation 8.1: Safe communications for children
In order to ensure safe communications for children the UCI should always be used. Communications services specifically targeted at children should make use of the UCI "authentic date of birth" element of the "additional information field" as a means to prevent misuse of these services by adults (see Recommendation 4.2).

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6   Conclusion

Identity, privacy, trust and control of the set-up and making of communications have always been identified as the primary strengths of UCI EG 201 940 [2], EG 202 067 [3], TR 103 077 [8] and EG 202 249 [4]. These issues apply to all communication users and may have greater importance for the target groups in their communication tasks. Recommendations on how to ensure that UCI is usable for all users are described in EG 202 249 [4] on usability guidelines for UCI. The recommendations in that document should be used in conjunction with the recommendations presented in this present document which are summarized in Annex B.

Applying the recommendations described in this present document will, in addition to the important general benefits of UCI described in clause 4, greatly enhance communications for the target groups. Some examples are shown below:

- Provide support that compensates for memory and learning deficiencies.

- Provide reassurance and support to less confident users.

- Prevent unnecessary exposure of a user's vulnerability.

- Prevent unwanted communications to vulnerable people.

- Allow helpers/carers of the UCI user to be involved in communications when necessary.

- Assign communication priorities between a person and their carer/parent.

- Allow emergency services to automatically access critical information stored in the user's PUA.

- Provide safe communications for children.

Annex A:
Generic user requirements for communications systems

A.1 Notes relating to the user requirements

A.1.1 Origin of the user requirements

The requirements in this Annex are those originally defined in EG 201 940 [2], with minor updates and clarifications. Guidelines in the present document support this set of user requirements.

A.1.2 Assumptions concerning the Universal Communications Identifier

Throughout this Annex an assumption has been made that whenever a Universal Communications Identifier (UCI) is referred to, it will be as defined in EG 201 940 [2].

A.1.3 Dependencies and conflicts

It should be noted that some of these user requirements may wholly or in part conflict with other requirements; some support other requirements and some are dependent on other requirements.

A.2 The user requirements

This Annex summarizes the generic user requirements of a modern, ideal communications system. For a more detailed analysis of these requirements and for a description of the system capabilities necessary to support such requirements see EG 202 067 [3].

A.2.1 Unifying the control of communications

Users, currently, can be faced with many options when wishing to setup, receive and manage their communications. Typically people may possess a fixed telephone, a mobile telephone, a PC with a home email address, another PC at work, an email address and a fax machine. Each terminal, application and service will have a different identifier, and method of setting up, receiving and managing communications. Each will also have different levels of control (e.g. a user can send an email labelled "urgent" but not make a telephone call similarly labelled) and different methods of storing communication history.

An effective and efficient multi-modal communications system would have a choice of terminals, a single universal identifier and a common method of setting up, receiving and managing communications.

User requirement No UR 1.1
Users require a unified method of, and support for, setting up, receiving and managing communications that is, as far as possible, independent of the terminal(s), application(s) and service(s) used. This would include provision of a single universal identifier covering all services and network types.

A.2.2   Seamless communication across networks and services

The independent development of different networks and services and their historical segregation has tended to make inter-network communication difficult if not impossible. Applications do exist to enable a user to send, for example, an email to a fax machine but typically it involves the user in significant effort. It is currently simpler for an originator to "experiment" until communication is established on one of the available networks than attempt to set up inter-network/inter-service communication.

User requirement No UR 1.2
Users require seamless communication across networks and services.

A.2.3   Increasing the options available to the originator

At the present time, an originator has little control over outgoing communications other than by choice of terminal. In future, the originator may want to specify the level of service required for a particular communication, specify what is to happen if the desired communication cannot be established or assign a priority. As the number of possible options increases, the complexity for the user may increase. The user will need to be allowed to choose their own balance between increasing the options that they control and reducing the complexity that a large number of choices can create.

User requirement No UR 1.3
The originator of a communication requires the ability to indicate to the system particular requirements relating to the outgoing communication.

A.2.4   Increasing the options available to the recipient

With the increasing number of communication options available to users it is becoming important to manage incoming communications effectively. In particular, a user may wish to divert incoming communications from one terminal to another depending on their own geographical location or the time/date. The recipient may also wish for the re-routing of communications to depend on the urgency of the call, who it is from or some other attribute. Geographically determined re-routing of communications could be automated to varying degrees by using a mobile network, GPS, Artificial Intelligence techniques, polling, or other forms of presence detection.

User requirement No UR 1.4
The recipient requires the ability to control incoming communications.

A.2.5   Dealing with communications conflicts between originator and recipient

If the originator has specified particular attributes or conditions for a communication and the recipient has specified communication management criteria which conflict with those, then the system entities which represent originator and recipient within the network(s) should negotiate a mutually acceptable solution.

User requirement No UR 1.5
Users require that conflicts between the communication requirements of the originator and the recipient should be resolved, where possible, without their intervention.

A.2.6   Maintaining backward compatibility

Future architectures will provide users with increased control over the sending and receiving of communications. Taking full advantage of this increased functionality will almost certainly require sophisticated user interfaces. However, for the foreseeable future, a large number of terminals (principally telephones) will have limited or no ability to input alpha characters. It is important that these users are still able to use communications systems based on the new architectures, albeit with decreased functionality.

User requirement No UR 1.6 - Maintaining backward compatibility
Users may wish to use basic input devices such as a 12-button numeric keypad to obtain a basic level of service, even when using future architectures.

A.2.7   Trust in the system

Trust in a communications system is clearly dependent on many issues other than technical ones. A user's trust in a communications system will be influenced not only by the security mechanisms within the system but by political and psychological factors as well.

However, trust can be maximized by providing "appropriate" levels of security. A typical user may not be concerned about the integrity of 95 % of their communications and supplying checks and verifications on these would be inefficient with respect to system performance and frustrating for the user. But for the remaining 5 % the user may require these features and needs to have confidence that in these cases appropriate security is in place.

User requirement No UR 1.8 - Trust in the system
To have trust in a communications system, users require an appropriate level of security to be provided and when necessary an assurance of the integrity of the communication and the identity of the person they are communicating with.

A.2.8   Appropriate level of privacy

Privacy is defined as the ability of the user to choose who knows their UCI and under what circumstances and from whom they can accept incoming communications. Users will wish to have the freedom to determine who is able to gain access to their UCI (via such mechanisms as UCI searches). They will also wish to have full control over who is able to communicate with them, when and by what means.

User requirement No UR1.9 - Appropriate level of privacy
Users will require different levels of privacy dependant on their individual needs.

Annex B:
Summary of recommendations

B.1   Requirements focus

Recommendation 1.1: Requirements focus
The user's preferred communication services should be determined from the "communication preference" element and not from any "disability" or "date of birth" element of the additional information field.

B.2   Accessibility

Recommendation 2.1: Assistive device unavailability
In the initial set-up of their PUA, UCI users should be provided with a dialogue that enables them to identify under what circumstances they will be unable to use their chosen terminal features, settings and assistive devices.

Recommendation 2.2: Alternatives to assistive devices
In the initial set-up phase, PUAs should offer a set of options for alternative ways to handle communications when users do not have their chosen terminal features, settings and assistive devices available.

Recommendation 2.3: User interface configuration
Terminals or services that have the ability to configure a user interface to a user's needs (e.g. enlarged text or voice amplification) should automatically request a UCI user's personal preferences from their PUA. The terminal or service should attempt to meet these preferences.

B.3   Usability

Recommendation 3.1: Simplicity
PUA providers should provide simplified set-up options, packages of functionality ranging from basic to comprehensive and simple presentation of information as the default.

Recommendation 3.2: Sequential dialogue assistance
A process in which the PUA leads the UCI user through a sequence of dialogue steps should be made available. This could be provided to the user by default, on request or if the PUA detects that the user is having difficulties.

Recommendation 3.3: Assisted call termination
Although it would not be desirable for a PUA to attempt to automatically terminate a communication, it could contact the user by one of the other means to which the user has access. It could then inform the user of the possible need to terminate the original communication.

Recommendation 3.4: System timeouts
Where the user profile indicates that longer timeouts are required, or where the PUA detects that timeouts are becoming a problem, then the PUA should request that they are provided when technically possible.

Recommendation 3.5: Alternative contact list labelling
PUA providers should be encouraged to support alternative means of labelling entries in contact lists. Support for the inclusion of photographs and voice labels should be provided.

Recommendation 3.6: Support for labelling elements of the "additional information field"
 PUAs should be able to recognize the "additional information field" elements for photographs and voice labels, even if the contact lists do not provide support for storing these.

Recommendation 3.7: Confirmation of user actions
Where a user is known to lack confidence the PUA could provide various stages of confirmation of user actions. These could include:
- a confirmation of the action that the user has taken (what the system believes the user has done);
- an indication of whether the action that the use has taken is what the system required ("correct") or not what was required ("incorrect");
- an indication of what corrective action the user should take to correct for any error or omission made.

Recommendation 3.8: Level of confirmation feedback
Users should be allowed to indicate the level of confirmatory feedback that they require.

Recommendation 3.9: Preferred means of communication
Every opportunity should be taken to encourage and make it easy for users in the target groups to indicate to the PUA both the means of communication that they prefer and those means of communication that they find very difficult or impossible to use.

Recommendation 3.10: Access to human help
Providers of interactive voice response systems should provide a means of access to a human help facility that can be invoked automatically by a PUA where appropriate.

Recommendation 3.11: Alternative voice menus
The providers of voice response systems should provide the option of menus with fewer options per menu that can be invoked if a UCI user's PUA requests it.

Recommendation 3.12: Bookmarking menu items
PUAs should provide a bookmarking facility that enables the user to store the means of accessing important or regularly used voice menu destinations. This would allow users to go straight to the areas of greatest interest to them.

B.4   Privacy and trust

Recommendation 4.1: Confidentiality
PUA providers should reassure users that information stored in their PUAs will only ever be released with the explicit agreement of the UCI user or to appropriate authorities in an emergency.

Recommendation 4.2: Authentic date of birth
The PUA provider should provide the capabilities for storing the UCI user's authentic date of birth. The PUA should be able to verify the "authentic date of birth" element of another UCI user's additional information field.

Recommendation 4.3: Privacy of additional information field data
PUAs should have rules that specify what additional information field elements the UCI user wishes to be supplied to other people during communications or directory searches and they should be made aware of the choices that have been made. The user should be provided with an easy mechanism for formulating these rules.

Recommendation 4.4: Prompting for release of information
Set-ups that frequently prompt the user to allow or disallow release of information should be avoided wherever possible. Such prompts could cause particular concern and difficulties for groups such as cognitive impaired people, children and elderly mentally infirm people.

Recommendation 4.5: Override of information release
PUA providers should provide the capability to allow parents or guardians to override or constrain a user's ability to release potentially sensitive and dangerous information (e.g. their age or infirmity).

Recommendation 4.6: Use of UCI-based directory services
People from the target groups should be encouraged to use the more flexible and powerful protection provided by UCI-based directory services. The wide range of options available are documented in EG 202 067 [3].

Recommendation 4.7: Restriction of access to children's directory details
The providers of directory services should try to provide options whereby access to a child's contact details is:
- restricted to a known list of trusted individuals;
- restricted to other children of a similar age (identified by means of inspection of the "authentic date of birth" information held by the child's PUA;
- subject to the agreement of the child's parents (who would typically have PUA management rights).

Recommendations 4.8: Reducing unwanted communications
Users who are concerned about unsolicited communications should be encouraged to only accept communications from people or organizations that use a UCI. For some very vulnerable groups it may be advantageous to filter incoming communications to only allow those from UCIs in their address book.

Recommendation 4.9: Sensitive communications
Because UCI allows the user to select the required service on a call-by-call basis, a UCI user should be provided with the means to easily select an automated relay service when engaging in sensitive communications and use their preference for a relay service with a human intermediary for all other communications. The choice of when to use an automated service could be determined by which UCI was being called or was calling or manually selected on a one-off basis.

B.5   Control of communications set-up

Recommendation 5.1: Pre-configured user profiles
A range of different "off-the-shelf" user profiles, specially configured to suit the communication needs of various segments of the target groups, should be made available to members of the target groups or their carers/parents. These could be provided by Service Providers, organizations representing the target groups, etc.

Recommendation 5.2: Third-party assistance
Organizations and service providers should be encouraged to provide personal assistance tailored to the needs of specific groups of users.

Recommendation 5.3: Appropriate use of delegated control
Carefully defined safeguards need to be in place to ensure that, where another person has any degree of delegation of control over a UCI user's usage and management, this control is appropriate to the circumstances. The safeguards also need to ensure that the delegated control cannot be abused.

Recommendation 5.4: PUA initiated assistance
The PUAs should offer UCI users, or their carers, options that could help them overcome difficulties that they appear to be experiencing (e.g. offering to automatically select the "connect to human operator" option if the user is always being timed out of voice menus in a system).

B.6   Control of making a communication

Recommendation 6.1: Provision of communication cost information
UCI-based systems should acquire whatever costing information is available from network and service providers so that users can be given a clear picture of how a communication will be charged. In this way, vulnerable users would be able to be protected from excessive and unexpected costs.

Recommendation 6.2: Control of communication based on cost
Rules that either bar communications or limit their cost, using available costing information, is another UCI feature that would be of particular benefit to some of the target groups.

Recommendation 6.3: Making urgent communications
Levels of priority can be assigned to any communication in UCI-based systems. All communications between UCI users and their partners/carers/parents which have been assigned a high priority should be treated in such a way that they take precedence over all other communications.

Recommendation 6.4: Keeping track of vulnerable users
PUA providers should provide a facility whereby an alerting call can be made when a vulnerable user has travelled to an "unexpected" location (e.g. a person suffering from dementia would not be expected to be wandering outside their house at night). These check calls could be to a nominated individual such as a parent or carer.

B.7   Contacting the emergency services

Recommendation 7.1: Emergency service access to PUA data
Emergency services should be given unique rights to access information contained in a UCI user's PUA without the permission of the UCI user.

Recommendation 7.2: Automatic assignment of specialist emergency operator
Emergency services should provide a facility to direct an emergency call to a specialist operator depending on the information relating to the age or any disabilities of the caller. Such information would be obtained from a UCI user's PUA (see Recommendation 7.1).

B.8   Safe communications for children

Recommendation 8.1: Safe communications for children
In order to ensure safe communications for children the UCI should always be used. Communications services specifically targeted at children should make use of the UCI "authentic date of birth" element of the "additional information field" as a means to prevent misuse of these services by adults (see Recommendation 4.2).

Annex C:
Important issues outside the scope of UCI

A number of issues were raised during the consultative process which were important for some of the user groups but which cannot be solved using the UCI. These are listed below:

- Some users will experience difficulties related to impaired memory abilities such as difficulty in remembering telephone numbers (see clause 5.3.5). Although UCI can provide some solutions that minimize the need to memorize information, UCI cannot improve a user's memory capabilities.

- Many users experienced difficulty using manuals, both paper and software based. Use of simple language and good illustrations is always recommended but is even more important for some of the members of target groups.

- Where users have physical impairments that inhibit their use of communications terminals, solutions outside the sphere of UCI must be sought. Examples of such difficulties include the abilities to lift a handset or to dial numbers on a keypad (see clauses 5.3.2 and 5.3.4).

- Under normal circumstances UCI communications are initiated from an address book so the user will not normally have to input a long number string. However for the rare cases when number entry is required, then terminal manufacturers should be encouraged to supply products which allow pre-dialling and editing before sending. This removes the system time-out pressure on users who experience difficulties in dialling.

- Terminal manufacturers should also be encouraged to provide a port for attachment of assistive devices on as many terminals as possible.

- Many elderly and cognitive impaired people have problems with too much functionality on a piece of equipment. Manufacturers should consider providing the option of terminals with limited buttons and simple functionality.

- One of the issues frequently raised during the consultative stages of the study was the naivety of many children and elderly people. Every opportunities should be taken to educate these vulnerable groups focusing on the dangers of releasing age, name and/or address information and explaining the tactics employed by unscrupulous individuals to elicit this data.

Annex D:
Organizations consulted

A very large range of organizations were consulted in the course of this work. The following organizations were either directly contacted or were identified as having been contacted during a secondary distribution of the questionnaires. Many other organizations were contacted as part of secondary distributions by individuals and by organizations such as the EDF. In addition to the organizations consulted, several individuals who either fitted the relevant category or who were acknowledged experts about one of the categories were contacted. To preserve personal privacy, no individual names have been listed.

The organizations have been placed under three headings according to the primary function of the organization (as understood by those doing the distribution). However, many of these organizations represent more than one group and several organizations returned multiple questionnaires.

D.1 Organizations associated with young children

British Education Communication and Technology Agency, Brighton University (School of Computing), British Broadcasting Corporation, Cambridge University (Faculty of Education), Coventry University (VIDe Research Centre), Dundee University (Department of Applied Computing), Technical University of Eindhoven (Department of Technology Management), Ericsson, European Commission, Köln University (Department of Education), Learning and Teaching Scotland, Lego Europe, Microsoft, Massachusetts Institute of Technology, Nottingham University (Department of Psychology), Philips research (Media Interaction Group), Sterling University (Institute of Education), Telenor, University College London, University of Vienna (Institut for Publizistik und Kommunikationswissenschaft), University of Northumbria.

D.2 Organizations associated with elderly people

Age and Cognitive Performance Research Centre, Age Concern, Age Concern Institute of Gerontology, BT, Dundee University, Empirica, European Commission, Ricability, Stakes, Work Research Centre.

D.3 Organizations associated with people with disabilities

British Centre for Deaf Studies, BT, Communication Matters, Danish Association of the Blind, Danish Centre for Technical Aids for Rehabilitation and Education, Connect Ireland, DeafAdults (Reading University), Deafblind UK, Delta Centre, European Blind Union, European Design for All e-Accessibility Network (EDeAN), European Disability Forum, Hearing Concern, INRIA, Institute for Rehabilitation Research, Intellect, Isdac, Members of the Oftel/DIEL committee, Members of the PhoneAbility committee, Mencap, National Disability Authority Ireland, RNIB, RNID, Telenor.

History

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<tr><td colspan="4" align="center">Document history</td></tr>
<tr><td>V1.1.1</td><td>March 2004</td><td>Membership Approval Procedure</td><td>MV 20040521: 2004-03-23 to 2004-05-21</td></tr>
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