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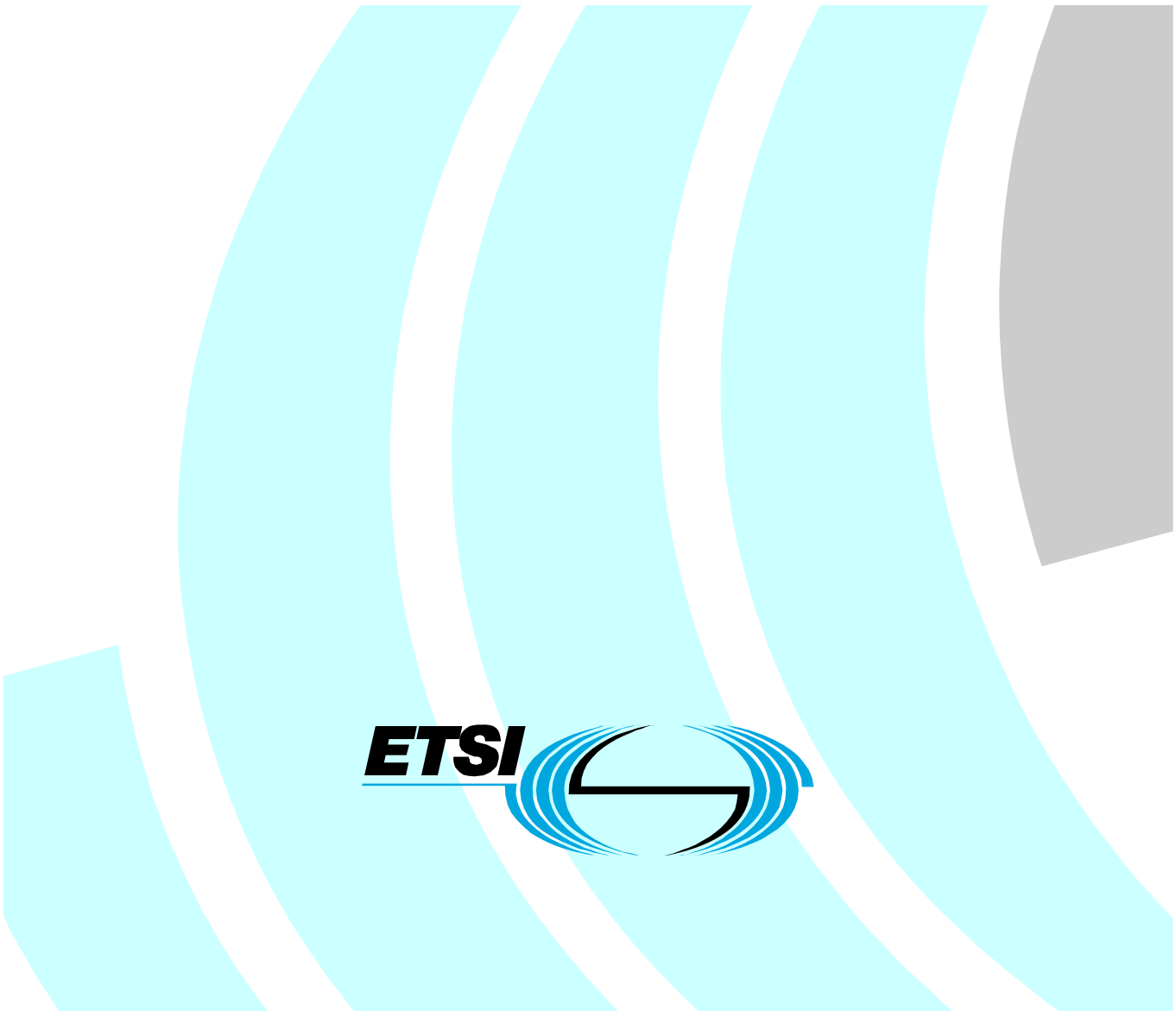
Technical Report

Human Factors (HF); User Experience; 3G and Mobile Broadband Interoperability Plugtest: Approach, scenarios and test specification; Outcomes, conclusions and recommendations



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Contents

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Foreword

This Technical Report (TR) has been produced by ETSI Technical Committee Human Factors (HF).

Intended users of the present document (as well as event participants) includes user experience and interaction design professionals, designers and developers of mobile networks, terminals, services and applications, mobile network and system providers and operators, terminal approvers, private and public requirement writers, consumer associations and user organizations, roaming managers, marketing, product management, industry associations and their members, policy makers and other interested stakeholders.

The event was addressed to infrastructure developers, mobile and broadband network operators, service providers, handset manufacturers, application providers and others interested.

Introduction

Mobile ICT plays an increasingly important role in the daily life and activities of many people. There is enormous potential for improving the user experience, if connectivity and interoperability between 3G devices, services, applications and the Internet is designed and developed in a way that makes them usable by and accessible to all end users.

People travel more than ever before both in business and for leisure and expect their mobile information and communication services to work seamlessly across borders and continents. The success story of GSM voice and text communication has also built expectations that are projected to more sophisticated services enabled by GPRS and 3G infrastructures. In the mean time, there is also pressure from various sources to decrease the differences between the cost of communication in the home network and foreign networks that further contributes to this trend. Therefore, the roaming user experience is more important than ever before and should offer automated interoperability with similar functional access, under full user control.

An effective e-society relies on the fact that all citizens are granted equal access. Ensuring interoperable access to mobile ICT services for all is a common goal for vendors, operators, service providers, user associations, consumer groups and policy makers. Achieving this will pave the way for a successful uptake of future, more advanced application areas of public interest such as telecare services, community focused applications or video telephony services targeting impaired users.

Mobile communication is a significant commercial and public policy success in *e*Europe. GSM and GPRS-based products have contributed significantly to the take-up of telephony among previously unconnected households, decreased social exclusion and the digital divide. This is in line with the "*e*Europe 2005 Mid-term review" (COM(2004) 108 [i.45]), stating that "…stimulating use and creating new services has become the central goal of eEurope 2005" and "…interoperable pan-European services…is a match with EU policy objectives and the needs of European citizens".

With the advent of more advanced and sophisticated services enabled by 3G/UMTS networks, terminals, applications and services, there are concerns that an increasing number of consumers may experience difficulties due to the increased complexity and an often sub-optimized user experience of mobile communication terminals and services. In order to overcome these serious potential risks, "Interoperability is critical for the deployment of mobile broadband services". Furthermore, "…industry to take steps towards interoperability for mobile broadband services as a matter of urgency" (the key conclusion of the European Commission's Communication COM(2004) 447 [i.46] on "Mobile broadband services").

Important user requirements such as easy, accessible and successful setup, configuration and access, excellent usability and accessibility, high reliability, fair stability, reliable and understandable security, seamless connectivity and interoperability are quickly becoming decisive success criteria for the uptake and usage of communication, information access, applications and services, a necessity in today's *e*-European society.

The on-going paradigm shift towards a knowledge-intensive Information Society has brought about radical changes in the way people work and interact with each other and with information.

Since the launch of the "eEurope - Information Society for All" initiative of the European Commission in 2000, the European Union (EU) has adopted a policy towards ensuring that all its citizens benefit from the changes the Information Society is bringing. This commitment is now further continued and enhanced in the i2010 (European Information society in 2010) initiative, which aims to provide an integrated approach to information society in the EU, covering regulation, research, and deployment and promoting cultural diversity, with the objective to ensure that Europe's citizens, businesses and governments make the best use of ICTs in order to improve industrial competitiveness, support growth and the creation of jobs and to help address key societal challenges.

Several human factors deliverables including technical reports, guidelines and standards developed by ETSI under the and co-sponsored by the above mentioned initiatives, are directly applicable to product implementations. This Plugtests event will, based on realistic scenarios and in the context of a body of best practices, examine the level of interoperability, user support and knowledge transfer offered by 3G-compatible products.

Ensuring interoperable access to mobile communication services for all is a common goal for vendors, operators, service providers, user associations, consumer groups and policy makers. Achieving this will pave the way for a successful uptake of future, more advanced application areas of public interest such as telecare services, community focused applications or video telephony services targeting impaired users.

1 Scope

The present document provides:

- the background, approach, scenarios, test specification and other necessary information for the performance of an ETSI "3G & Mobile Broadband Interoperability Plugtest" event (held during April 24-26, 2008); and
- a summary of the event's results, achievements, outcomes, conclusions and recommendations.

The event, the very first of its kind, addressed the user experience of mobile ICT services, based on realistic scenarios and ETSI Human Factors standards, guidelines and recommendations. In the context of a body of best practices human factor enablers and the level of interoperability, user support and knowledge transfer offered by 3G-compatible products throughout the most relevant phases os use (addressed through a product/use lifecycle perspective) were examined, discussed and concluded.

2 References

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.
- Non-specific reference may be made only to a complete document or a part thereof and only in the following cases:
  - if it is accepted that it will be possible to use all future changes of the referenced document for the purposes of the referring document;
  - for informative references.

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

For online referenced documents, information sufficient to identify and locate the source shall be provided. Preferably, the primary source of the referenced document should be cited, in order to ensure traceability. Furthermore, the reference should, as far as possible, remain valid for the expected life of the document. The reference shall include the method of access to the referenced document and the full network address, with the same punctuation and use of upper case and lower case letters.

NOTE: While any hyperlinks included in this clause were valid at the time of publication ETSI cannot guarantee their long term validity.

2.1 Normative references

The following referenced documents are indispensable for the application of the present document. For dated references, only the edition cited applies. For non-specific references, the latest edition of the referenced document (including any amendments) applies.

Not applicable.

2.2 Informative references

The following referenced documents are not essential to the use of the present document but they assist the user with regard to a particular subject area**.** For non-specific references, the latest version of the referenced document (including any amendments) applies.

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

[i.2] ETSI EG 202 132: "Human Factors (HF); User Interfaces; Guidelines for generic user interface elements for mobile terminals and services".

[i.3] ETSI EG 202 416: "Human Factors (HF); User Interfaces; Setup procedure design guidelines for mobile terminals and services".

[i.4] ETSI EG 202 417: "Human factors (HF); User education guidelines for mobile terminals and services".

[i.5] ETSI TS 102 511: "Human Factors (HF); AT Commands for Assistive Mobile Device Interfaces".

[i.6] ETSI TR 102 068: "Human Factors (HF); Requirements for assistive technology devices in ICT".

[i.7] ETSI ES 202 076: "Human Factors (HF); User Interfaces; Generic spoken command vocabulary for ICT devices and services".

[i.8] ETSI EN 301 462: "Human Factors (HF); Symbols to identify telecommunications facilities for the deaf and hard of hearing people".

[i.9] ETSI EG 202 116: "Human Factors (HF); Guidelines for ICT products and services; "Design for All"".

[i.10] ETSI TR 102 133: "Human Factors (HF); Access to ICT by young people: issues and guidelines".

[i.11] ETSI EG 202 423: "Human Factors (HF); Guidelines for the design and deployment of ICT products and services used by children".

[i.12] ETSI EG 202 191: "Human Factors (HF); Multimodal interaction, communication and navigation guidelines".

[i.13] ETSI TR 101 767: "Human Factors (HF); Symbols to identify telecommunications facilities for deaf and hard of hearing people; Development and evaluation".

[i.14] ETSI ETR 095: "Human Factors (HF); Guide for usability evaluations of telecommunications systems and services".

[i.15] ETSI TR 102 202: "Human Factors (HF); Human Factors of work in call centres".

[i.16] Void.

[i.17] ETSI TR 102 415; "Human Factors (HF); Telecare services; Issues and recommendations for user aspects".

[i.18] ETSI EG 202 421: "Human Factors (HF); Multicultural and language aspects of multimedia communications ".

[i.19] ETSI SR 001 996: "Human Factors (HF); An annotated bibliography of documents dealing with Human Factors and disability".

[i.20] ETSI EG 201 103: "Human Factors (HF); Human factors issues in Multimedia Information Retrieval Services (MIRS)".

[i.21] ETSI ETR 297 Edition 1: "Human Factors (HF); Human Factors in Videotelephony".

[i.22] ETSI ES 201 275: "Human Factors (HF); User control procedures in basic call, point-to-point connections, for Integrated Services Digital Network (ISDN) videotelephony".

[i.23] ETSI ES 202 432: "Human Factors (HF); Access symbols for use with video content and ICT devices".

[i.24] ETSI EG 202 048: "Human Factors (HF); Guidelines on the multimodality of icons, symbols and pictograms".

[i.25] ETSI ETS 300 375: "Human Factors (HF); Pictograms for point-to-point videotelephony".

[i.26] ETSI ETR 070: "Human Factors (HF); The Multiple Index Approach (MIA) for the evaluation of pictograms".

[i.27] ETSI ETR 329: "Human Factors (HF); Guidelines for procedures and announcements in Stored Voice Services (SVS) and Universal Personal Telecommunication (UPT)".

[i.28] ETSI ES 202 130: "Human Factors (HF); User Interfaces; Character repertoires, orderings and assignments to the 12-key telephone keypad (for European languages and other languages used in Europe)".

[i.29] ETSI ES 201 381: "Human Factors (HF); Telecommunications keypads and keyboards; Tactile identifiers".

[i.30] ETSI EG 202 325: "Human Factors (HF); User Profile Management".

[i.31] ETSI EG 202 067: "Universal Communications Identifier (UCI); System framework".

[i.32] ETSI ETR 333: "Human Factors (HF); Text Telephony; Basic user requirements and recommendations".

[i.33] ETSI TR 101 806: "Human Factors (HF); Guidelines for Telecommunication Relay Services for Text Telephones".

[i.34] ETSI EG 202 320: "Human Factors (HF); Duplex Universal Speech and Text (DUST) communications".

[i.35] ETSI EG 202 534: "Human Factors (HF); Guidelines for real-time person-to-person communication services".

[i.36] ETSI White Paper No. 3: "Achieving Technical Interoperability - the ETSI Approach".

[i.37] European Commission Mandate M 376: "Mandate M 376 (Standardization mandate to CEN, CENELEC and ETSI in support of European accessibility requirements for public procurement of products and services in the ICT domain)".

NOTE: Available at http://www.etsi.org/WebSite/document/aboutETSI/EC_Mandates/m376en.pdf.

[i.38] ISO 9241-11: "Ergonomic requirements for office work with visual display terminals (VDTs) -- Part 11: Guidance on usability".

[i.39] ETSI ETR 116: "Human Factors (HF); Human factors guidelines for ISDN Terminal equipment design".

[i.40] ETSI ETR 175: "Human Factors (HF); User procedures for multipoint videotelephony".

[i.41] ISO 20282: "Ease of operation of everyday products".

[i.42] ETSI TS 100 900: "Digital cellular telecommunications system (Phase 2+) (GSM); Alphabets and language-specific information (GSM 03.38)".

[i.43] IETF RFC 4103: "RTP Payload for Text Conversation".

[i.44] ETSI EG 202 487: "Human Factors (HF); User experience guidelines; Telecare services (eHealth)".

[i.45] COM(2004) 108: "Communication from the commission to the council, the European Parliament, the European economic and sociam committee and the committee of the regions".

[i.46] COM(2004) 447: "Communication from the commission to the Council, the European Parliament, the European economic and social committee and the committee of the regions".

[i.47] ITU-T Recommendation T.140: "Protocol for multimedia application text conversation".

3 Definitions and abbreviations

3.1 Definitions

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

design for all: design of products to be usable by all people, to the greatest extent possible, without the need for specialized adoption

ICT devices and services: devices or services for processing information and/or supporting communication, which has an interface to communicate with a user

impairment: any reduction or loss of psychological, physiological or anatomical function or structure of a user (environmental included)

operator: entity perceived by the user as offering the physical mobile service

NOTE: This includes mobile virtual network operators and traditional operators.

service: ICT service that provides the complete capability, including terminal equipment functions, for communication between users, systems and applications, according to agreed protocols

terminal: physical device which interfaces with a telecommunications network, and hence to a service provider, to enable access to a telecommunications service

NOTE: A terminal also provides an interface to the user to enable the interchange of control actions and information between the user and the terminal, network or service provider.

usability: effectiveness, efficiency and satisfaction with which specified users can achieve specified goals (tasks) in a specified context and particular environments, see ETR 095 [i.14] and ISO 9241-11 [i.38]

NOTE: In telecommunications, usability should also include the concepts of learnability and flexibility; and reference to the interaction of more than one user (the A and B parties) with each other and with the terminals and the telecommunications system, see ETR 116 [i.39].

user: person who uses a telecommunications terminal to gain access to and control of a telecommunications service or application

NOTE: The user may or may not be the person who has subscribed to the provision of the service or owns the terminal. Also, the user may or may not be a person with impairments.

user education: any information provided to users of a product or service on the functionality provided by the product or service and any instructions on how this functionality is to be used

NOTE: User education can be provided through a range of media from paper to multimedia.

user guide: technical communication documents, intended to give assistance to users using a particular product

NOTE: They are written by a technical communicator and are also known as "manual".

user interface (UI): physical and logical interface through which a user communicates with a telecommunications terminal or via a terminal to a telecommunications service (also called man-machine interface, MMI)

NOTE: The communication is bi-directional in real time and the interface may include control, display, audio, haptic or other elements, in software or hardware.

user requirements: requirements made by users, based on their needs and capabilities, on a telecommunication service and any of its supporting components, terminals and interfaces, in order to make use of this service in the easiest, safest, most efficient and most secure way

3.2 Abbreviations

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

3G	Third Generation Mobile Communication Systems, also known UMTS and IMT-2000
COCOM	European Communication Committee
GPRS	General Packet Radio Service
HF	Human Factors
ICT	Information and Communication Technologies
IMT-2000	International Mobile Telecommunications-2000
INCOM	Inclusive Communication
ISO	International Organization for Standardization
MIRS	Multimedia Information Retrieval Systems
MMS	Multimedia Messaging Service
PC	Personal Computer
SIM	Subscriber Identity Module
SMS	Short Message Service
TC	Technical Committee
UCI	Universal Communications Identifier
UI	User Interface
UMTS	Universal Mobile Telecommunication System
WAP	Wireless Application Protocol
Wi-Fi	Wireless-Fidelity (ISO/IEC local area network standard family 802.11, also known as WLAN)
XML	eXtensible Mark-up Language

4 Background

4.1 The importance of a good ICT user experience for interoperable services

The capabilities offered by mobile communication solutions evolve, from only being able to make a call, use voice-mail and possibly send and receive text messages to downloadable personalization achieved through ring signals, software programs such as games and the introduction of multimedia information services such as mapping and directions, traffic information, messaging and e-mail access, TV broadcast and video streaming and quasi-cordless functionality or video call services.

Technological advances and market pressures have made telecommunications and ICT products and systems increasingly complex, feature rich and miniaturized. Research results indicate that novice as well as advanced users are equally worried for the high complexity of new technologies.

An effective e-society relies on the fact that all citizens are granted fair access. Ensuring interoperable access to mobile ICT services for all is a common goal of vendors, operators, service providers, user associations, consumer groups and policy makers. Achieving this will pave the way for a successful uptake of future, more advanced application areas of public interest such as telecare services, community focused applications or video telephony services targeting impaired users.

Human Factors standardization does not restrict the ability of market players to further improve and develop their terminals and services, nor does it limit their options to trademark user interface elements or profile the user experience of brand-specific user interface implementations as a competitive edge.

In the recent past, the expenses of a far-too technology-centric development have been experienced by the mobile industry and valuable lessons have been learned from the development and launch of e.g. WAP, GPRS and MMS access and services, including their roaming capabilities. These technologies did not quickly enough achieve the envisaged market penetration among end users necessary to cover the cost of investments in the infrastructures and led to an increase of the customer care costs, damaged visions and disappointed end users, also influencing operational results.

It is our hope that by addressing the roaming user experience in a more dedicated way, this work can contribute to the identification of potential issues and highlight necessary and beneficial actions to further improve it.

4.2 ETSI Technical Committee Human Factors (TC HF)

Human Factors is the scientific application of knowledge about human capacities and limitations in order to make products, systems, services and environments effective, efficient and easy for everyone to use. It is a key factor for the commercial success of any ICT product or service in the digital networked economy.

The Human Factors Committee is the Technical Body within ETSI, responsible for Human Factors issues in all areas of Information and Communications Technology (ICT). It produces standards, specifications, guidelines and reports that set the criteria necessary to build optimum usability into the emerging digital networked economy.

The HF committee co-operates with other groups within ETSI and outside to assist them to produce standards, or other deliverables, which are in accordance with good Human Factors practice. Within ETSI it has a special responsibility for "Design for All" addressing the needs of all users, including young children, seniors and disabled people.

An important goal of TC HF's operations is to ensure that at least minimum levels of common and specific user requirements are known, understood, specified and well supported in industry-wide technical ICT standards, technology platforms and product implementations, leading to an improved overall user experience, satisfying established usability and accessibility criteria. This goal is achieved through careful balancing, not to limit innovation, nor influence the company-and brand-specific user experience.

Since its establishment in 1990, ETSI TC HF has developed numerous requirement, guideline and standards deliverables, addressing many areas of ICT. Since 1998, ETSI and TC HF has worked in close collaboration with the European Union, European Commission and the European Free Trade Association, assisting the implementation of the "*e*Europe - Information Society for All" initiative through the *e*Europe 2002 and 2005 action plans for a better used and a more accessible fixed and mobile ICT environment. This commitment is now further continued and enhanced in the i2010 (European Information society in 2010) initiative, which aims to provide an integrated approach to information society in the EU, covering regulation, research, and deployment and promoting cultural diversity, with the objective to ensure that Europe's citizens, businesses and governments make the best possible use of ICTs.

For a full listing of and more information about these deliverables and their applicability, see clause 6, [i.19] and www.etsi.org (where all deliverables are available free of charge).

4.3 Interoperability and the ETSI Plugtests™ concept

The goal of ETSI is to ensure that instances of non-interoperability are not caused by poor or insufficient standardization, as clearly stated in [i.36]. Within the current competitive market environment, the risk of non-interoperability is increasing, because of e.g. small windows of opportunity due to fast evolution of technology, the use of non-open standards. The main aim of standardization is to enable interoperability in a multi-vendor, multi-network, multi-service environment. The absence of interoperability should not be the reason why final services for which there is great demand do not come into being.

The ETSI Whitepaper on Interoperability [i.36] describes the following levels of interoperability:

- **Technical interoperability:** usually associated with hardware/software components, systems and platforms that enable machine-to-machine communication to take place. This kind of interoperability is often centred on (communication) protocols and the infrastructure needed for those protocols to operate.

- **Syntactical interoperability:** usually associated with data formats. Messages transferred by communication protocols need to have a well-defined syntax and encoding, even if it is only in the form of bit-tables. Many protocols carry data or content, and this can be represented using high-level transfer syntaxes such as HTML, XML or ASN.1.

- **Semantic interoperability:** usually associated with the meaning of content and concerns the human rather than machine *interpretation* of the content. Thus, interoperability on this level means that there is a common understanding between end users of the meaning of the content (information) being exchanged. User experience can be regarded as mainly belonging to this level, even if it will also play an important role on the other levels.

- **Organizational interoperability:** the ability of organizations to effectively communicate and transfer (meaningful) data (information) even though they may be using a variety of different information systems over widely different infrastructures, possibly across different geographic regions and cultures. Organizational interoperability depends on successful technical, syntactical and semantic interoperability.

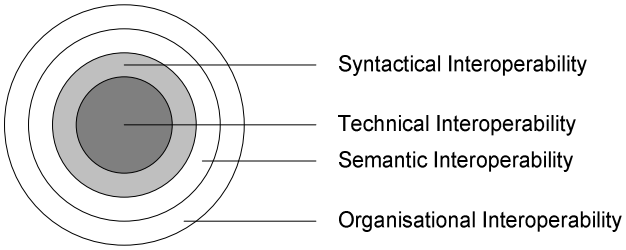

Figure 1: Different levels of interoperability

The most common reasons to why a standard fails on interoperability are, according to [i.36]:

- incompleteness;
- inadequate interfaces;
- poor specification, consistency and implementation of options; and
- lack of clarity;
- poor maintenance.

It can easily be concluded that most reasons relate to human factors and will most probably have a considerable influence on the user experience of the service.

By the time this work was originally planned and performed, the ETSI Plugtests Service was a professional unit of ETSI specializing in organizing and running interoperability test events for a wide range of telecommunications, Internet, broadcasting and multimedia converging standards.

Plugtests events are open to all companies, organizations, working and study groups implementing a standard (regardless of their ETSI Membership), including:

- Operators, Vendors or Equipment manufacturers, who are about to place their product on the market, want to be sure of the interoperability of their products and feel comfortable with the technologies but still want to improve their know-how.
- Standardization bodies (ETSI, IETF, ITU, etc.) or any forum or interest group, that are developing an important standard or specification, want to check the coherence of the specifications implemented, need to check progress in using their specification or want to let their members get useful feedback for quickly and efficiently adapting or improving their specifications.

Plugtests events aim at improving interoperability by creating an opportunity for companies to test their prototypes against a standard with their partners and competitors. That will typically contribute to:

- Enhancing the quality of specifications;
- Speeding up the standardization process;
- Reducing time to market;
- Supporting the deployment of a technology;
- Improving the overall product use experience.

For further details, see the ETSI Whitepaper on "Achieving Technical Interoperability" [i.36].

In 2008, ETSI has launched "INTEROPOLIS", a product-enabling service, ETSI now offers ‘Idea to Product' solutions for all issues related to standardization. Efficient interoperability is a crucial challenge within ICT and the launch of INTEROPOLIS acknowledges the complexity of ICT standardization, which increasingly comprises not only of multiple technologies but also of multiple organizations and structures which have to cooperate with each other. Its creation draws on many years' of experience in interoperability acquired through ETSI's former Protocols and Testing Centre (PTCC) and Plugtests™.

Positioned towards the product end of the value chain, INTEROPOLIS will offer customers:

- Test methodology and development (consulting, design, development);
- Pragmatic operational interoperability initiatives (including Plugtests™ events);
- Training (testing methodologies, TTCN-3, validation best practice, test tool engineering):
- Test tool engineering (consulting, support to build solutions, promotion of open solutions); and
- Technologies validation (support and technical expertise for validation schemes).

Whereas the ETSI Forapolis service is considered technology-enabling, INTEROPOLIS is product-enabling. This double-offering is expected to be a major step forward for all those with a stake in seeing improved ICT interoperability, such as working groups and Décor.

5 An introduction to applicable ETSI TC HF deliverables

Over the last fifteen years ETSI has published a wide range of documents that were produced by the ETSI Human Factors Technical Committee. There are 96 currently published ETSI Human Factors documents that range from Technical Reports (TRs) that contain descriptive text and no requirements, ETSI Guides (EGs) providing guidelines and recommendations to ETSI Standards (ESs) and European Norms (ENs) that contain mandatory requirements. The following clauses only make reference to a small subset of this large catalogue of documents.

All of the ETSI Human Factors documents are available on-line and can be downloaded free of charge from www.etsi.org.

NOTE: As per February 2007: click on "Standards", then "Download ETSI Standards", "Publications Download Area", enter "HF" in the new window and mark the "Technical Body Name" and "All on 1 page".

5.1 Basic areas

The ETSI Technical Committee Human Factors (TC HF) have produced a number of deliverables that give guidance on product and service development techniques that should enhance the user experience.

ETR 095 [i.14] and the later EG 201 472 [i.1] are documents that give a very comprehensive view of the many alternative ways in the usability of products and systems can be evaluated and identify where, in the design cycle, these may best be applied. ETSI also describes a very thorough and comprehensive technique for the evaluation of icons, symbols and pictograms in ETR 070 [i.26].

Two recently published documents have been developed after significant input from, and consultation with companies from the mobile communication sector. These are:

- EG 202 416 [i.3];
- EG 202 417 [i.4].

There have been many published documents that address user interface and usability issues of specific network types (e.g. ISDN) or services (e.g. videotelephony). Some of the earlier documents address technologies that are now very well established or even virtually obsolete. However, some of these documents contain recommendations and guidelines that can be applied to more recently developed technologies. One good example is EG 201 103 [i.20] which addresses the "Human Factors issues in Multimedia Information Retrieval Systems (MIRS)". Although this was published in 1998, well before the introduction of today's highly interactive database driven web services, it provides valuable guidance that can still easily be applied to the design of new systems.

One large collection of best practice guidance and a collection of guides written exclusively to address access by people with disabilities was replaced by the comprehensive and useful guide EG 202 116 [i.9] on "Guidelines for ICT products and services; "Design for All".

Over the years, ETSI HF has published a number of guides and standards related to videotelephony. All of these documents were written in the context of ISDN videotelephony as this was the only realistic technology available when they were written. However, due to the fact that the majority of the guidelines and recommendations relate to basic user requirements and the fundamental logic behind user control procedures, these documents still provide a valuable source of guidance that can be applied in today's more topical domains of internet-based and mobile videotelephony. The following documents still have significant relevance:

- ETR 297 [i.21];
- ES 201 275 [i.22];
- ETR 175 [i.40];
- Documents relating to symbols/icons associated with videotelephony (see below in this clause).

A comprehensive set of guidelines related to "multimodal interaction, communication and navigation" are contained in EG 202 191 [i.12].

More recent work on real-time person to person communication encompasses all forms of person to person communication including videotelephony. This work is documented in EG 202 534 [i.35] and provides a very comprehensive set of guidelines about factors (e.g. the purpose of the interaction, the presence of delays in the system, video screen size) that will affect the quality of the user experience of face-to-face communication using a range of different types of communication service (e.g. voice, text, video). Despite the title of EG 202 534 [i.35], the scope also covers scenarios such as remote video inspection and people communicating with avatars.

ETSI has also created documents that list sets of symbols/icons that have been tested for their comprehensibility. These are:

- ETS 300 375 [i.25];
- EN 301 462 [i.8];
- ES 202 432 [i.23].

Guidance on the use of icons, symbols and pictograms in a multimodal user interface environment is contained in EG 202 048 [i.24].

There are two documents that relate to voice systems. The first, ES 202 076 [i.7] specifies a "generic spoken command vocabulary for ICT devices and services". Voice commands are given in five European languages and these have all been tested with users to assess their suitability for use, currently under updating to address all official EU and EFTA languages and Russian.

The second voice related document is ETR 329 [i.27] on "Guidelines for procedures and announcements in Stored Voice Services (SVS) and Universal Personal Telecommunication (UPT)". Although an old document, ETR 329 [i.27] specifies a common standard that can be (and frequently is being) followed for the class of voice system where the user inputs characters from a 12-key keypad and the system responds with voice messages. It is hoped that in the near future ETSI can update this approach to cover interactive 2-way voice systems - where the user keypad input is replaced with or augmented by recognition of user voice input.

5.2 Mobile communication

Earlier ETSI work on generic user control procedures and supplementary services were done in close collaboration with the ETSI Special Mobile Group, which ensured that GSM and 3G specifications for terminals and supplementary services mirrored those requirements.

All of the documents referred to in clause 6.1 have relevance for specific mobile communication situations as well as for other telecommunication and ICT applications. As such, the relevance of these documents as sources of guidance for specific design or evaluation situation should always be assessed. However, several more recent ETSI HF documents have been directed specifically at the user experience of the mobile communications product and services domain.

The most significant work related to the mobile domain is EG 202 132 [i.2] on "Guidelines for generic user interface elements for mobile terminals and services". This involved a great deal of industry consultation to agree a minimum set of harmonized user interface features and application behaviours that a user might expect to encounter. This items within this set were chosen both for their importance in enhancing the familiarity and quality of the user experience and for their lack of importance as areas of competitive design differentiation between terminal manufacturers and between service providers. A 3G/UMTS-specific version is currently under development, intended tobe published by the end of 2008.

Two ETSI Guides have published in October 2006, intending to enable and improve the use of mobile services. EG 202 416 [i.3], provides "setup procedure design guidelines for mobile terminals and services", while EG 202 417 [i.4] specifies a set of "user education guidelines for mobile terminals and services".

Another area that is largely aimed at the mobile market (although it may also be applied in fixed telephony situations) is that of the "character repertoires, ordering rules and assignments to the 12-key telephone keypad" for official languages in Europe. This has been documented in version 1.1.1 of ES 202 130 [i.28]; version 2.1.2 has now been published, including all official European languages, European minority languages and some non-European languages used by a considerable number of users in Europe.

ES 202 076 [i.7] on a "generic spoken command vocabulary for ICT devices and services" referred to in clause 6.1 is also very applicable both to voice driven handsfree operation of mobile terminals and to mobile telephony based services. The updated version under development (with an end-2008 publication target date) will address some 30 languages.

5.3 Specific accessibility work

The original approach of ETSI HF was to cover age and disability issues in a separate sub-group from that of all of the other human factors of telecommunications issues. With the greater appreciation of the need to try to address the needs of all users when designing ICT systems, current ETSI HF work is carried out by an undivided committee, applying a true "design for all" approach. This approach has a most visible output in the form of EG 202 116 [i.9] on "Guidelines for ICT products and services; "Design for All". This document was specifically created to replace:

- a single wide-ranging guide to the human factors issues associated with ICT terminals and services, but which had little to say in relation to issues associated with age or disability;
- a number of smaller scope documents that were tightly focussed on the needs of elderly and disabled users but which did not relate strongly to other ETSI Human Factors work.

EG 202 116 [i.9] now acts as a core, main reference document in addressing the user experience issues of all users, including elderly users, disabled users and young children (see also below). A document that catalogues and explains the purpose of the ETSI HF published documents related to disability is SR 001 996 [i.19]. It should be borne in mind that this document will not contain details of HF documents published after the date at which the latest edition has been published.

One simple solution that was pioneered by ETSI Human Factors was getting firstly European and then international agreement for a tactile identifier on smart cards that enables people who cannot see the visible features of the card to orientate it correctly before inserting it in a reader. The ETSI version of this specification is published as ES 201 381 [i.29].

Recognizing that it is not possible to design every product so that it perfectly meets the needs of all users (e.g. a mobile phone that is so small that it can be carried in the shirt pocket of all users cannot have a keypad large enough to meet the needs of a person with severe hand tremor), alternative solutions to meeting the needs of all users were addressed by ETSI HF. The result of this approach has been TR 102 068 [i.6] which investigates how mass-market products could use a standard interface method to connect to range of assistive devices that are perfectly tuned to meet the needs of people with various disabilities.

Currently in Europe and elsewhere, many deaf users communicate with each other and with other users (via a relay service that uses a human intermediary) using a "text telephony" service. These services use specialized terminals and use a range of incompatible systems throughout Europe. This results in a situation where only communication within a country can be guaranteed to work. Previously ETSI HF have published documents that gives guidance on:

- ETR 333 [i.32];
- TR 101 806 [i.33].

At first glance it would seem that traditional internet chat services would offer a good global alternative to the specialized text telephony services. However, text telephony users are used to the letter-by-letter full duplex conversational interface that they currently enjoy and that closely simulates the dynamic environment in which a speech conversation takes place. The simplex block-by-block style that internet chat services almost universally enforce gives text telephony users an inferior user experience. ETSI have proposed a "Duplex Universal Speech and Text (DUST) communications" approach in order to:

- provide text telephony users with the full duplex conversational dialogues that they require;
- enable them to participate in conversations with all users and offer this enhanced style of chat to all users;
- permit mixed text and voice conversations according to the specific needs, preferences and abilities of whoever is using the system;
- make the greatest use possible of existing internet protocols to allow DUST services to be deployed and used at the least cost and with the greatest convenience for all users.

DUST is specified in EG 202 320 [i.34].

Furthermore, ETSI has pioneered work within the standards field by addressing the needs of young children with regard to their requirements when using telecommunications products and services. For example, very young children may have quite limited language skills and the range of services and lot level of usage of those services may be under control of their parents. The consequences of these and many other factors were examined in TR 102 133 [i.10] on "Access to ICT by young people: issues and guidelines". Guidelines derived from this analysis are described in EG 202 423 [i.11] on "Guidelines for the design and deployment of ICT products and services used by children".

5.4 Personalization, internationalization and user identification

Once users become familiar with the basic capabilities of mobile terminals and services, they are likely to wish to personalize them to suit their own individual needs. The designers of terminals, networks and services all recognize this desire and attempt to provide the user with various personalization mechanisms. The choices that a user makes to configure their user experience are saved and stored in some form of user profile.

The user profiles of each terminal or service subscription may contain differing sets of user configurable settings. Also, the structure of the way that these settings are stored may be complex.

EXAMPLE: Settings for an application or terminal may be:

- global and apply to all users of that application or terminal;
- personal to one user only;
- applicable in all contexts;
- applicable to only a single context (e.g. when online and actively using a service).

In the mobile ICT environment, the things that a user can configure, in order to personalize their experience, may relate to the terminal, the network or the service. Currently, users may have to repeat the same configuration settings in the terminal, the network and the service. For example, a user may have to configure language settings in the mobile terminal (sometimes with more than one language setting needing to be configured) and also in each service being used. Having to repeatedly make the same setting in different contexts will annoy users and, as they frequently have a poor understanding of the way in which their environment is split between terminal, network and service, they may be very confused. When the same setting needs to be made in several different places, and users fail to do so, aspects of the user experience (e.g. the user interface language) may change in apparently random ways and be very confusing to the user.

A user profile is defined in EG 202 325 [i.30] as the total set of user related rules and settings which affect the way in which a user experiences terminals, devices and services. As users have unclear understandings of the functional architecture (e.g. the terminal, the network and the service) that lies behind their total user experience, it would be beneficial if user profiles related to the user's total experience and not to those aspects of the user experience that relate to the individual, poorly understood, system components.

Recognizing the potential for duplication, confusion and unwanted behaviour that results from multiple uncoordinated user profiles, a comprehensive and co-ordinated approach to managing user profiles is described in EG 202 325 [i.30]. Following the approach proposed in [mx] can simultaneously lead to reductions in the complexity and duplication of effort for the user and more powerful methods for personalizing the user experience.

Whereas personalization addresses the ways in which a user can adapt system behaviour to their individual needs, localization addresses ways in which a system can be adapted to suit the requirements of all users from a particular cultural and linguistic background. Traditionally, localization activities are carried out during the design and deployment of terminals and services in order to create a version that will suit the presumed requirements of a person from a specific locale (a country and language combination). Detailed guidelines for the localization of user guides (covering all modalities) are provided in EG 202 417 [i.4].

In traditional localization, user needs are addressed on the assumption that all users within a locale will have a common set of cultural and linguistic requirements. This assumption is decreasingly valid in today's environment, where there is an ever increasing amount of travel and communication between different countries, and where people have competences with and communicate in languages unrelated to their principal language (i.e. the language of their chosen locale). Because localization techniques are applied separately during the development and deployment of terminals and services, the assumptions that underlie the localization choices made for a terminal may differ from those made for a service that may be accessed by that terminal. Also, this separate handling of language and cultural factors in terminals and services results in users frequently having to specify the same cultural or linguistic requirement both in setting up the terminal and in setting up the service. Alternatively, a service may try to configure its language and cultural settings according to regional norms implied by the terminal configuration. This approach may fail to correctly match the user's actual language and cultural requirements and may create very inappropriate service settings e.g. basing service settings on the norms that apply to the region from which a SIM card originates may result in very inappropriate language settings if a user has purchased a local SIM in a visited country where they cannot speak the local language.

Ongoing work in ETSI is addressing the difficulties and limitations in accurately matching a user's potentially complex language requirements in the highly complex current and future mobile communications environments. Solutions that exploit a combination of current personalization and localization techniques are amongst the range of solutions being proposed. The results of this work will be published in EG 202 421 [i.18].

A reduction in the quality of the user experience also occurs in relation to the topic of user identifiers. Currently, people may have a wide range of identifiers associated with their ICT environment e.g. a telephone number associated with each telephony subscription, multiple email addresses, instant messaging ids, etc. Users may have difficulty remembering their own wide range of user identifiers but, more importantly, if other people only know one or two of these user identifiers they only have a restricted subset of ways of reaching the user. Whilst users use restricted distribution of their user identifiers as a mechanism to control their personal privacy, this is a relatively crude and ineffective way of meeting this need. A user's ICT environment is made unnecessarily complex and ineffective as a result of the rigid association of user identifiers with service subscriptions.

As well as the complexities and inefficiencies caused by multiple user identifiers, the presentation of these indicators during the initiation of a new communication:

- can either give no meaningful information that identifies the person initiating the communication (e.g. a telephone number); or
- the information presented cannot be trusted (e.g. the "from" field associated with an email).

Both of the issues raised above seriously undermine the efforts to create a unified and trustworthy user experience. To address these issues, and to create an environment that offers users significantly more control of their communication, ETSI has been developing the concept of the Universal Communications Identifier (UCI). The principles and outline architecture of UCI are described in EG 202 067 [i.31]. TISPAN is currently investigating ways of incorporating UCI into NGNs and the outcome of this investigation will be published as an ETSI Technical Specification early in 2007.

5.5 Specific application areas

As ICT becomes a well established, necessary tool in today's society, ETSI is expanding its coverage of application areas.

Many deliverables mentioned above provide beneficial guidance, applicable to the development and deployment of specific application areas. These include their configuration and setup (EG 202 416 [i.3]), user guides (EG 202 417 [i.4]), user interfaces (ES 202 076 [i.7], EG 202 048 [i.24], ES 202 130 [i.28]), usability testing (ETR 095 [i.14]), assistive device connectivity (TR 102 068 [i.6]), accessibility (ES 202 076 [i.7], TR 102 133 [i.10], TR 101 767 [i.13], EN 301 462 [i.8], EG 202 320 [i.34]) and multicultural issues (EG 202 421 [i.18]).

Even so, in many cases, there is a need to provide a more dedicated set of guidelines and recommendations to certain areas of importance. Therefore, TC HF has active work items and plans to address areas such as the usability of corporate business communication services, *e*Governmnet services or the human factors of emergency communications during the next years.

Work is currently on-going in three important application areas:

***e*Health/Telecare** services, where ETSI has recently set up an ETSI Project (EP) eHealth. TC HF realized early the importance of *e*Health and has already developed TR 102 415 [i.17], looking at the human factors issues of Telecare and providing "recommendations for user aspects of Telecare services". This is intended to be a first prestudy of the area. The document provides support for the *e*-Europe policy framework to move forward on the delivery of on-line public services in the health and social care sectors, by enabling and improving the delivery of telecare services with a good user experience.

Human factors and the user experience of telecare solutions is a complex area, given the large number of influencing elements involving the establishment of human confidence, device setup, configuration, calibration and maintenance, data collection, user procedures, cultural issues such as the use of language and illustrations, the organization of the care provisioning process, and communication with diagnostic systems and carers, human communication and confirmation and decision making, the presentation medium and accessibility issues. In addition, as telecare services can be used not only in but also outside of homes, usability aspects relating to the specifics of mobile environments and equipment and service use need to be covered. Finally yet importantly, these services are be used by young, older people, impaired, disabled or temporarily ill people and should therefore be designed, deployed and maintained thereafter.

This work is followed up in the current draft EG 202 487 [i.44] that will provide "user experience guidelines for Telecare services".

***e*Government** services, where TC HF has established a work item and is investigating the development of human factors guidelines for the design, development, secure access and use of *e*Government services. It is intended to address a multitude of platforms, access terminals and modalities (e.g. the telephone, Web, graphical and speech UIs).

Assistive device connectivity plays an important role in implementing access for all and offers an excellent complement in cases where design for all cannot accommodate for the requirements of all users. Realizing the possibilities offered by assistive devices to a considerable number of users of information and communication services, TC HF developed TR 102 068 [i.6] to specify the human factors requirements for assistive technology devices in ICT". This work is now followed up for the standardization of the necessary protocols and their integration into main-stream standards in TS 102 511[i.5], "AT Commands for Assistive Mobile Device Interfaces".

A fourth important application area, **Software applications** (such as interactive games and positioning services) have not been addressed explicitly but there are available recommendations applicable to certain user groups (e.g. EG 202 116 [i.9], TR 102 133 [i.10], EG 202 423 [i.11]) or well defined development areas (e.g. EG 202 416 [i.3], EG 202 417 [i.4], ES 202 076 [i.7] and EG 202 191 [i.12]). The on-going 3G-specific expansion of EG 202 132 [i.2] is also addressing it.

6 A usage life-cycle oriented approach

From an end user's perspective, the product life cycle is typically described as containing the four stages "Pre-purchase/Pre-subscribe", "Purchase/subscribe", "Ownership/use" and "Repurchase/Upgrade", as described in EG 202 417 [i.4]. In order to avoid misunderstandings with relation to the established use of the "product life-cycle", we have chosen to call use "usage life-cycle".

For the purpose of the current work, in order to simplify this approach but also to address common issues related to "Purchase/subscribe" and "Ownership/use", we have merged these and address them together (see figure 2).

In each of the phases, the users' needs differ:

- In the "Pre-purchase/ Pre-subscribe" phase, the users will typically try to inform themselves about the availability of certain solutions that would satisfy their needs and will try to assess whether the product meets their requirements. Users intending to upgrade to the next generation of a product or service are usually interested in knowing whether the user interface of the new device or service will be improved but still seem familiar to them, reducing the need for relearning. Accessibility, reliability, coverage, cost and technical compatibility are common issues.

- In the "Purchase/subscribe" "Ownership/use" phase, users will go through steps required for being able to make their buying decision, activate and use the product. Their use will also evolve, change and mature over time; the terminal functionality may be extended, or a new service can be taken into use (e.g. download a new application that requires access and connectivity). Users will need to how to manage updates and solve problems arising in terminal or service usage (or both). User education plays an important role in this phase for service and feature discovery. These steps typically also include activation of services, selection of service parameters, definition of personal access parameters and the set up of the device or service to operate with the user's pre-existing environment (e.g. PIM data).

In the "Repurchase/Upgrade" phase, users will wish to discard/dispose a terminal (or its components), how to replace it with another one keeping the available service or replacing it. An important issue at the end of the life cycle is how stored data or settings can be transferred to the replacement device or service.

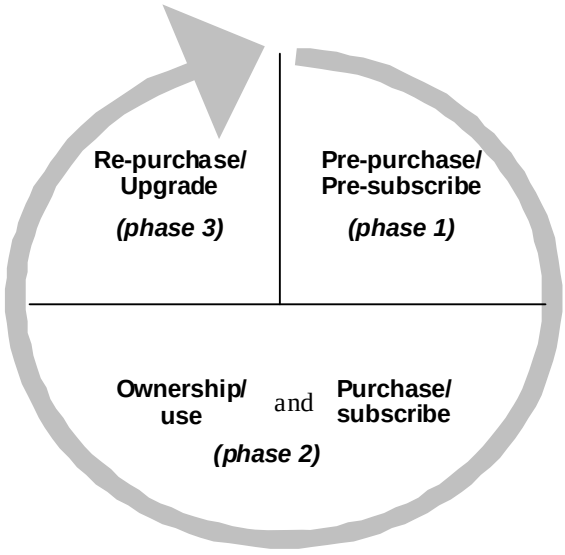

Figure 2: Products and services usage life cycle from user point of view

Using a scenario evolving over the timeline of a product lifecycle, with discrete scenarios will highlight interoperability issues between services, devices and networks, users and customer care and will provide a loose framework for following discussions.

7 Event planning, organization and overview

7.1 Planning and organization: three trials

The planning and organization of this first-ever interoperability event showed to be a difficult and extremely time-consuming task. According to the original plans, the event was scheduled to take place during October 10- 13, 2006.

The agenda of the first event planned had the following layout:

Table 1: October 2006 Plugtest event details

<table>
<tr><th>Time</th><th>Tuesday 3rd October</th><th>Wednesday 4th October</th><th>Thursday 5th October</th><th>Friday 6th October</th></tr>
<tr><td>09:00
12:30</td><td>Registration from 10:00 onward

Material set-up</td><td>Product lifecycle : Pre-use</td><td>Product lifecycle : Replacement</td><td>Debriefing</td></tr>
<tr><td>12:30
13:30</td><td colspan="4">LUNCH @ France Telecom Self Service</td></tr>
<tr><td rowspan="3">13:30
17:00</td><td rowspan="2">Welcome Session: Presentation of ETSI & Human Factors</td><td rowspan="3">Product lifecycle : Ownership</td><td>Applications sessions
1. Software</td><td rowspan="3"></td></tr>
<tr><td>2. Assistive device interfacing</td></tr>
<tr><td>Preparation of a real life scenario : user case</td><td>3. e-Health</td></tr>
<tr><td>18:00
Onward</td><td></td><td>Social Event</td><td></td><td></td></tr>
</table>

Due to a variety of reasons (presented in detail in clauses 10 and 11), the original plan had to be cancelled and a new date was identified for a second attempt (during January 23-26, 2007).

During October- November 2007, considerable promotional efforts were invested into the review of the program, the updating of the session plan and the promotion of the event. The agenda and plans for the second Plugtest, scheduled for January 2007, were as illustrated in table 2.

In spite of considerable efforts invested intodefining an interesting program and promoting the event at various conferences, symposia, direct contacts and other means (including emails and posters displayed at various locations, including ETSI), shortly before the end of the registration deadlines, there were fewer than 10 people registered for the events and both were postponed.

According to the plans, the event was supposed to start in the afternoon of January 23, 2007 by introducing ETSI's relevant Human Factors work and establishing a participant's common "bird's eye-view" of the area. It will also introduce such horizontal areas as accessibility and design for all, human factors enablers including the setup and configuration of devices and services, user education, spoken commands, multicultural and language issues and addressing and user profiles.

On January 24-25, three dedicated sessions were planned to address terminal, network, service and application-specific issues throughout the product lifecycle phases of pre-use,/pre-subscription, use/ownership and replacement.
The fourth dedicated session will address software applications and one or several areas of public interest related to e-Health and e-Government, emergency communications, gaming and banking applications, messaging applications or assistive device interfacing (matter of participant's interest).

The event was planned to end by lunchtime on January 26 with a result summary and benchmarking session (fully respecting inter-participant result privacy concerns). Beneficial results will be reported to the EC-mandated accessibility standards inventory work.

Table 2: January 2007 Plugtest event details

Time	Tuesday 23rd January	Wednesday 24th January	Thursday 25th January	Friday 26th January
09:00 12:30	**Registration and setup** from 10:00 onward	**Session 2: Pre-use/ pre-subscription**	**Session 4: Replacement**	**Session 6: Debrief workshop and results summary**
12:30 13:30	**LUNCH @ France Telecom Self Service (included in registration fee)**			
13:30 17:00	**Session 1: Welcome and Introduction**	**Session 3 : Ownership and use**	**Session 5: Applications**	
18:00 Onward		**Social event (dinner)**		

7.2 The Plugtest event (April 24-26, 2007)

It had become clear that an event in the originally planned format, particularly one that charged participants considerable fees in addition to the loss ow work hours and the coverage of travel expenses for attending, was not attracting potential participants (including micro, small and medium enterprises).

For the third trial event, it was decided to make the first day of the event a one-day conference.

The second day was primarily designed according to the plans similar to those of the April event.

The final day of the revised event was a session that offered both interoperability testing and a discussion session on a single focussed topic - the concept of "Total Conversation" which can combine real-time fully duplex text communication with simultaneous voice and video communication.

After another round of considerable replanning, refocusing and promotional activities, the date was moved forward with three months (to April 24- 26, 2007) and the agenda was processed through a considerable update by means of approach and content, trying to identify the key values potential participants would consider attractive and important.

The first day of the event was a one-day conference. The intention was to invite presenters working on a variety of topics with a considerable relevance to the profile of the Plugtest and have contributions from non-ETSI speakers as well as papers related to the results and ongoing activity of many of the relevant activities being pursued in Specialist Task Forces (STFs) run by the ETSI Human Factors Committee.

This approach was an attempt to provide a tangible output that attendees could take from the event, instead of only sessions that required the attendees to contribute by participating in testing situations. It was hoped that most attendees would see a benefit in hearing about such a large amount of relevant work being done in ETSI. It also offered a good opportunity for the STFs to downstream their findings to a very appropriate audience.

The second day was primarily designed according to the plans similar to those of the January event but with more flexibility, allowing participants to influence and decide the topics addressed.

The final day of the revised event was a session that offered both interoperability testing and a discussion session on a single focussed topic - the concept of "Total Conversation" which can combine real-time fully duplex text communication with simultaneous voice and video communication.

The details are reported in the following clauses.

7.2.1 Day 1: User Requirements, Human Factors and Practical Experiences Conference

The agenda of the first day was formed around five major blocks:

1) Welcome, Opening and Introduction;

2) A Keynote presentation given by the TC HF Chairman on " Human Factors and Interoperability Opportunities for ICT Networks in the 21st Century";

3) Interoperability aspects of 3G and mobile broadband communication; Increasing the Usability and Accessibility of the 3G;

4) Increasing the Usability and Accessibility of the 3G; and

5) Practical experiences: Roundtable discussion.

Table 3 illustrates the sessions, topics and presentations given during the first conference day.

Table 3: Plugtest event details for Day 1 (April 24, 2007)

8:30 - 9:00	Registration and coffee
9:00 -10:00	**Welcome, Opening and Introduction:** - **Introduction to the event and approach:** *Bruno von Niman, ETSI TC Human Factors Vice Chairman and Event leader and Mike Pluke, ETSI Expert*. - **Introduction to ETSI's Plugtests Service:** *Philippe Cousin, Interoperability Service Manager*. - **The Interoperability Whitepaper:** *Milan Zoric, ETSI PTCC.*
10:00 - 10:45	**Keynote: Human Factors and Interoperability Opportunities for ICT Networks in the 21st Century:** *Stephen Furner, BT Senior Technologies Manager and ETSI TC Human Factors Chairman*
10:45 - 11:15	Coffee Break
11:15 - 12:30	**Interoperability aspects of 3G and mobile broadband communication:** - **Generic3G User Interface Design Guidelines:** *Matthias Schneider-Hufschmidt, Vice President IP and Standards, BenQ Mobile and ETSI Expert*. - **eHealth and Telecare Services in 3G environment**. - **Supporting cultural diversity: Expanding the language coverage of the ETSI spoken command vocabulary standard:** *Mike Tate, Chimera and ETSI STF*. - **Making Public transport Information accessible through ICT:** *Peter Raemy, Swiss Telecommunications Association*. - **The SME perspective:** *Karine Iffour, NORMAPME and ETSI USER Chailady.*
12:30 -14:00	Lunch Break
14:00- 15:45	**Increasing the Usability and Accessibility of the 3G:** - **Relay Services for Deaf Users:** *Wally Mellors, ETSI STF*. - **Experiences from deploying accessible mobile and Web-based text telephony services in public networks, with main stream devices (see note)**: * Part 1: **System and service aspects :** *Thor Nielsen, Ericsson/Netwise.* * Part 2: **Field trial feedback from end users:** Johnny Kristensen, Tolkcentralen ÖLL. NOTE: A Swedish National Post and Telecom Agency project. - **Assistive Device Connectivity:** *Francoise Petersen, APICA, ETSI STF*. - **Increasing the ICT Industry's awareness of child users**: *Anne Clarke, European Management Services and ETSI STF*. - **Mobile Phone = bike shed: Young people, mobile phones and sex:** *Emma Bond, Chimera, University of Essex.* - **Language and Cultural aspects of public internet access:** *Mike Pluke, Castle Consulting.*
15:45 - 16:15	Coffee Break
16:15 - 17:00	**Practical experiences: Roundtable discussion:** - **Selected presenters, industry, European Commission and ETSI representatives** *Moderator: Bruno von Niman and Mike Pluke*
17:15 - 17:30	**Summary, conclusions and introduction of Day 2 and 3**

7.2.2 Day 2: Plugtests sessions: 3G and Mobile Broadband Enabled Services

Table 4: Plugtest event details for Day 2 (April 25, 2007)

8:30 - 9:00	Registration and coffee
9:00 - 9:15	**Welcome, approach and practicalities**
9:15 - 10:45	**Session 1 : Mobile Messaging**
10:45 - 11:00	Coffee Break
11:00 - 12:30	**Session 2 : Seamless Networking**
12:30 - 14:00	Lunch Break
14:00 - 15:30	**Session 3 : Multimodal communication**
15:30 - 16:00	Coffee Break
16:00 - 18:00	**Session 4 : Assistive device connectivity**

7.2.3 Day 3: Plugtests continued: Accessible Mobile and Web-Based, Conversational Services

Table 5: Plugtest event details for Day 3 (April 26, 2007)

8:30 - 9:00	Registration and coffee
9:00 - 9:15	**Welcome, approach and practicalities**
9:15 - 9:45	**Overview of INCOM's and TCAM's plans and activities (Daniel Quintart, European Commission,** DG Information Society and Media, H3 Unit - ICT for Inclusion and **INCOM/TCAM groups)**
9:45 - 12:30	**Functional aspects of accessible, mobile and Web-based, conversational services: PART I**
12:30 - 14:00	Lunch Break
14:00 - 16:00	**Functional aspects of accessible, mobile and Web-based, conversational services: PART II**
16:00 - 16:30	Coffee Break
16:30 - 17:30	**Summary and conclusions**
17:30	**End of day 3 and closure of the event**

7.3 Organizational efforts

For all three events planned, considerable efforts were invested into finding the dates with regards to other events taking place, ensuring the necessary available space for the Plugtest, preparing detailed agendas, specifications, web sites, registration information, welcome packs, et cetera.

Furthermore, extensive efforts were made to attract participants. Flyers and posters were printed and distributed at various other (ETSI and non-ETSI) events and numerous direct and indirect announcements and contacts were made through ETSI Collective letters, emails, email lists (of ETSI and other organizations) and personal contacts.

Details of some of these preparations are provided in annex A.

8 The use case and focus area specifications for the first and second Plugtest events

For the purpose of the two Plugtest events originally planned, we chose to work with one main dynamic scenario and let it evolve over the time-line (see the date stamps attached), the product life-cycle and by means of maturity, complexity and experience. Our intention was to introduce the persona and the scenario below and apply it to a number of the specific areas, chosen by the potential participants, as a matter of their interests and focus areas. These are reported in detail in the following clauses.

8.1 Persona and scenario

The main persona is Mario Bartoldi, a 35 year old diabetic man living in Germany, who works as sales manager for an Italian shoe company. He travels extensively in Europe and communicates in Italian, German, Spanish and English. Mario's business is also developing in China.

Using a mobile for 11 years, Mario changes mobile every 6 months to 1 year, also often changing between operators: "I am still searching for good customer service!".

Mario uses a mobile phone most often provided through the operator. He has the UI of the phone set to Italian but sets the default text messaging word completion to German (as most of the time he is sending emails and SMSes to other German businesses, except for when SMSing with his blind Grandfather).

He uses his 3G mobile for work and pleasure - using web and email services, listening to music and playing games as well as using productivity applications, community information services and mobile private banking.

Mario considers himself a good critic of mobile devices and services and regularly takes part in market research studies. "They should listen to people like me!".

8.2 Session 1: Introduction, overview and warm-up

A presentation of participants, introduction to the event and related practical issues and a review of the Plugtest agenda will be followed by an introduction to high-level ICT usability principles and specific standards guidance.

By covering these areas, participants will be given a common grounding allowing them to understand observations made by the moderators and to apply their own criticisms to the usability of service and device inter-operation scenarios.

High-level ICT usability terms: it is important that participants understand the terms and processes that will be cited through the following sessions. These include: User-Centred Design, User Interface, Product Interface, Human Factors, Ergonomics, User's Mental Model, Usability, Heuristic Evaluation, Task Analysis, Use Case, Scenario, Expert Walkthrough and Out of the Box Experience, Usage life-cycle.

Introduction to key guidelines documents: several applicable and relevant sets of guidelines (e.g. Schneiderman's Golden Rules, Nielsen's heuristics, ISO 20282 [i.41], and some ETSI deliverables described in clause 6).

Introduction to the persona and use case: the use case and its role within the workshop will be introduced, including its development over a time-line with some suggested dates.

Introduction to key principles for expert walkthrough of interoperating services: the moderator will describe a typical expert walkthrough based on three cyclical stages:

1) The use case is the starting point;
2) A user goal from the use case will be analysed e.g. download game from portal;
3) The user interface of the interoperating system is then assessed by the following questions:
    a) Is a step to move closer to the user's goal made clear in the user interface?
    b) Is mechanism provided to the user to make this step?
    c) Does the system inform the user that the step has been completed or if not, instructions on how to complete it?

The following usability checklist, based on main principles will be discussed:

1) Keep control with the user.
2) Automate setup as far as possible.
3) Allow roll-back of actions where possible.
4) Provide consistent support information and access to human assistance at all times.

5) Provide useful feedback in a timely manner.

6) Help information should move the user towards a successful solution.

7) Make cost and functional dependencies clear to the user ahead of time.

8) Allow users to cancel services.

9) Make costs transparent.

10) Provide information on privacy and security, where desirable.

11) Support all use in the user's preferred language through adequate localization.

12) Design for differing user abilities and functional limitations.

8.3 Session 2: Pre-purchase/subscription

January 2007*: Mario is browsing the operator website to view his on-line bill and notices that a new service is being advertised.*

a) Goes into store to enquire about your service and is given information about how to set it up. He leaves the store and begins to setup the service.

b) He follows set up service from operator's website.

Issues to focus on during the testing session and related deliverables:

- How does the user learn about your service?
- How are initial settings communicated and activated by the user?
- Where are these settings stored (e.g. as part of service subscription data, on the SIM, in the phone)? What happens if the phone battery dies immediately after configuring the service from the phone?
- How would a local (German) retail outlet configure the service when the UI of Mario's phone is set to Italian?
- Are all handsets supported?
- Are all languages supported? Is language set automatically? If so what is the language set to - operator country, country of issue of SIM, user's UI language?
- Does your service require adjusting the settings of other bearers/services?
- How does your service integrate with on-line operator services?
- How is cost communicated?

8.4 Session 3: Ownership/use

February 2007*: Mario goes on an extended tour of UK retail outlets for 2 weeks. Which phone to choose? He takes his phone with him and uses his home operator.*

a) He switches on the phone on arrival in the UK and needs to access your services immediately.

b) He is in his residence and has time to reconfigure as necessary.

April 2007*: Mario goes on a project to China for 6 weeks to visit manufacturers and retail outlets. He takes his phone with him and uses a Chinese operator.*

a) He switches on the phone on arrival and needs to access certain services immediately.

b) He is in his residence and has time to reconfigure.

c) He becomes curious to find out about the cost of the services he is using, partly due to an ad in a newspaper offering free use of SMS to those who select the network and interesting options for international (voice-only?) calls.

***July 2007**: Mario is back travelling around Germany, visiting retailers from cities to countryside.*

Issues to focus on during the testing session and related deliverables:

- How does he access home services when roaming?
- How does he know cost of services when roaming?
- How does he access customer support (home network or not)?
- What happens to service capability as Mario crosses 3G/2G boundaries?
- How to setup multiplayer games?
- How well does the hardware (handset), network and service interact? Are language settings for feedback and information output aligned to give a single language user experience? How?
- How does he switch text messaging language? How many "clicks" if using menus?

8.5 Session 4: Re-purchase/subscription

December 2007: Mario has decided to upgrade his phone to one with new capabilities.

a) Takes new phone from operator.

b) Changes operator and upgrades phone.

c) Wishes to cancel service, sign new service plan and transfer his local applications.

Issues to focus on during the testing session and related deliverables:

- How does Mario know if the service will work on new phone?
- Will Mario get the same service related user settings when the phone and SIM are changed?
- Will the service automatically adjust for the new products IO/processing capabilities?
- How is data/settings transferred to the new product?
- How can the service be upgraded and transferred?
- How can the service be cancelled and the new one substituted?
- What will be the cost of contacting customer support? Which language will he be met with?

8.6 Session 5: Applications

The focus of this session will be on one or several of the areas proposed below, depending on the participant's interest. Qualified moderators will be available to lead these.

Those intending to participate at the event may influence the content of this session; therefore, you are invited to comment and provide additional contributions to the following clauses.

8.6.1 *e*Health

January 2008: Mario has become ill and is using a temporary Telecare monitoring unit.

The monitoring data is sent through the Wi-Fi and mobile networks to a care centre, ready to provide information and further assistance to him, if and when required.

Issues to focus on during the testing session and related deliverables will include:

- Service information and setup;
- Service availability and reliability;
- Multicultural issues; and
- Specifics of roaming services.

8.6.2 *e*Government

April 2008: Mario is travelling but needs to validate (sign) his tax declaration for 2007 (he forgot to do so before leaving).

While doing this, he would also like to reactivate his interest in the community waiting list for new, 2-bedroom apartment.

Issues to focus on during the testing session and related deliverables will include:

- Service access including alternative options;
- Installation, setup and configuration;
- Compatibility and user identification;
- Feedback provisioning and error handling;
- Multiple platforms.

8.6.3 Messaging and media handling

January 2007- February 2008: Mario has decided to make email access more instant and location-independent, while on the move.

He will need to examine all available options, their pros and cons including their related costs and device dependencies, order and set up the service, synchronize the service and find out about the best text entry and output options.

He would also like to have access to the latest news, sports clips and favourite TV shows.

Issues to focus on during the testing session and related deliverables will include:

- Service information.
- Service setup and configuration (multiple devices).
- Service access.
- Multi-platform issues.
- Content retrieval, streaming and broadcasting.
- Cost issues.
- Text entry options.
- Text output options.

8.6.4 Software applications: emergency communications and gaming

January 2007- February 2008: Mario has decided to upgrade his phone to one with new capabilities. Activating a system that gives warning of global disasters (e.g. a tsunami) is his first task , followed by the download of his favourite PC game, now available on mobile platforms.

Issues to focus on during the testing session and related deliverables:

- Device capabilities.
- User requirements.
- Service information.
- Service ordering and confirmation.
- Confirmation of functionality.
- Cross-platform compatibilities and redundancies.

8.6.5 Assistive device connectivity and capabilities

December 2008: Mario sends SMSes several times a week to his blind Grandfather when travelling.

As Mario now has a new smartphone and the Grandfather will soon have to buy a new phone (as the old one has given up) , he wishes to assist the Grandfather with the selection of a new one, which supports his assistive device by offering suitable connectivity.

Issues to focus on during the testing session and related deliverables will include:

- A real-life example.
- User requirements.
- Functional requirements and capabilities.
- Connectivity aspects.
- Extended functional requirements.
- Total Conversation options.

8.7 Session 6: Debrief workshop, results summary and conclusions

This session was intended to be held together with all participants and outlined at a later stage during the development of the current document.

The current plans indicate that this will be a benchmarking session, fully respecting inter-participant result privacy concerns.

Beneficial results were intended to be reported to the EC-mandated (Mandate M 376 [i.37]) ICT public procurement accessibility requirements inventory work, started in 2007.

9 Plugtest

9.1 Day 1: Presentations

The agenda of the first day was formed around five major blocks, addressing topics of a considerable importance to the main event topic:

1) Welcome, Opening and Introduction;

2) A Keynote presentation given by the TC HF Chairman on " Human Factors and Interoperability Opportunities for ICT Networks in the 21st Century";

3) Interoperability aspects of 3G and mobile broadband communication; Increasing the Usability and Accessibility of the 3G;

4) Increasing the Usability and Accessibility of the 3G; and

5) Practical experiences: Roundtable discussion.

The presentations given have been uploaded to the event's web site and made available to the participants and other interested stakeholders.

Figure 3: Participants attending a presentation during the first day

A brief summary is provided below:

During the **first session**, attended by nearly 30 participants, the event was introduced by the event leaders and ETSI staff. Furthermore, the Interoperability Service Manager gave a presentation on the focus of ETSI's activities and the importance of the area. A considerable effort was put into presenting ETSI's Interoperability white paper [i.36], "Achieving Technical Interoperability - the ETSI Approach", to the participants.

The second session was a Keynote presentation, given by the TC HF Chairman Stephen Furner on the topic of" Human Factors and Interoperability Opportunities for ICT Networks in the 21st Century". He addressed topics including technical standardization, innovation and change, the importance of usable and accessible ICTs in daily life and challenges to TC HF in the perspective of the topic discussed, pointing out the need for technology to interoperate with its end users.

The third session addressed **"Interoperability aspects of 3G and mobile broadband communication". The presentations given were:**

- **Generic 3G User Interface Design Guidelines:** Matthias Schneider-Hufschmidt, Vice President IP and Standards, BenQ Mobile and ETSI Expert, presented the work of ETSI STF322 and addressed issues related to the user experience of 3G devices, services, systems and applications.

- ***e*Health and Telecare Services in 3G environment:** Bruno von Niman, ITS/vonniman consulting and ETSI STF299 Leader, introduced the ongoing work focusing on the development and provision of guidelines to make eHealth services more usable, accessible and interoperable.

- **Supporting cultural diversity: Expanding the language coverage of the ETSI spoken command vocabulary standard:** Mike Tate, Chimera and ETSI STF 326 Leader, introduced the ongoing development work of an expanded spoken command vocabulary by means of language coverage that will bridge gaps between ICTs and its users by access to the provided services using the most natural interface, speech.

- **Making Public transport Information accessible through ICT:** Peter Raemy, Swiss Telecommunications Association presented and analyzed issues and challenges currently faces in Switzerland, trying to make public transport information available and accessible through ICT.

- **The SME perspective:** Karine Iffour, NORMAPME and ETSI USER Chailady, talked about identifying users, the main challenges faced by them, and benefits and potentials to small and medium-sized European enterprises within the framework of the addressed topic.

The fourth session after lunch focused on "**Increasing the Usability and Accessibility of the 3G".** The following presentations were given:

- **Relay Services for Deaf Users:** Wally Mellors, ETSI STF 325, described the difficulties met by European users of relay services and set out the aims of this currently ongoing work of considerable importance and relevance [i.15]. The relay service standard being produced is intended to be a harmonizing and stimulating factor for establishment of European relay services of all kinds.

- **Experiences from deploying accessible mobile and Web-based text telephony services in public networks, with main stream devices (see note):**

  - Part 1: **System and service aspects :** Thor Nielsen, Ericsson/Netwise.

  - Part 2: **Field trial feedback from end users:** Johnny Kristensen, Tolkcentralen ÖLL.

  NOTE: A Swedish National Post and Telecom Agency project.

  These two presentations addressed the very interesting experiences from deploying accessible mobile and web-based text telephony services in Sweden. After a detailed introduction of the system and service aspects, potentials and limitations, the conclusions from a first field trial with end users were presented, together with plans for the future (including the introduction of the work to ETSI TC HF) were presented and met great interest.

- **Assistive Device Connectivity:** Francoise Petersen, APICA, ETSI STF 304, presented the work of her team and its importance in the perspective of interoperable services, offering users who would otherwise face exclusion means to access services and applications through assistive devices. The Technical Specification the team worked on provides recommendations for standardized interfaces to ICT devices through AT Commands for controlling and interacting with mobile devices, see TS 102 511 [i.5].

- **Increasing the ICT Industry's awareness of child users:** Anne Clarke, European Management Services and ETSI STF 323, introduced the work of ETSI TC HF addressing the design of technology for and children's use of ICTs, focusing on the necessity of more child-aware approaches when developing interoperable ICT services and applications for children.

- **Mobile Phone = bike shed: Young people, mobile phones and sex:** Emma Bond, Chimera, University of Essex, gave an inspiring research-oriented presentation on children, sex and the media. She introduced the background to the research, the research methodology, findings and their implications on interoperability - specifically, aspects of privacy, trust and risks.

- **Language and Cultural aspects of public internet access:** Mike Pluke, Castle Consulting, presented the work performed by ETSI STF 287 and 324 on user-oriented handling of multicultural issues in multimedia communications and its applicability to the recently started work on "Extending e-Inclusion for Public Internet Access Points (PIAPs)". As socially disadvantaged people and interoperability are two key topics of this work, issues related to social, cultural and access-related barriers and potentials were highlighted and discussed.

After the afternoon coffee break, a roundtable discussion was held around "**Practical experiences**", with all participants discussing and concluding upon the most interesting and relevant topics of the day, that also concluded Day 1. In the perspective of the topic addressed, it was agreed that much has been achieved by means of usability, accessibility and interoperability, offering more opportunities to end users than ever before. However, partly due to these facts, continuous and focused efforts are required in order to ensure a good user experience to interoperable and accessible 3G and mobile broadband-enabled ICT services and applications, gaining an increased importance in everyday life for a considerable number of users.

Before the end of the day, the plans for Day 2 and Day 3 were presented by the event organizers.

9.2 Day 2: Focus area sessions

9.2.1 Session 1: Mobile messaging

In this session, two issues related to the writing of SMS messages will be raised. One relates to the ease of changing language settings according to the language in which the message is to be sent and the other relates to the differing maximum length (and hence costings) of messages in languages that use multi-byte characters and those that do not.

9.2.1.1 Generating SMS messages in another language and changing SMS language settings

The issue to be investigated here is when a person attempts to write an SMS message in a language different to the one already configured in the phone.

Where predictive text input is activated (the normal default), the phone will, in most cases, propose words in the language set in the phone - not the language that the user is attempting to write in. If the user overrides the predictive text and enters multi-tap mode, the phone will suggest adding each foreign language word to the spell-checking dictionary.

This effect can be demonstrated to the audience. Then the strategies that users can currently use to overcome these difficulties can be introduced. These are:

- struggle with the problems for each message typed in a different language;

- access the SMS language setting menu and change the language, which will then need to be changed back after each foreign language messaging session is ended.

Both of these methods are far from easy and convenient for the user. This will be evaluated during a dedicated session.

The significant tasks will be:

- To identify whether an option to change the SMS language is available in the main menu of the phone - a "Yes/No" choice.

- If not, test whether the user can predict under which menu category the SMS language selection choice can be found - a "Right/Wrong" choice that can be made after completing task 1 and can be verified after completion of task 4.
- To see how the SMS language choice option is named - the name will be documented.
- Record how many steps it takes for the person to access the list of SMS languages in their first attempt to do so - a numeric answer.
- Record the minimum number of steps that are needed to access the list of SMS languages - a numeric answer.

The proposals introduced in EG 202 421 [i.18] will then be introduced and shown to be a potentially complete solution to the problem of sending messages to regular contacts in a range of languages. The range of different ways in which the language fields can be populated will also be described.

9.2.1.2 Issues related to multi-byte characters in SMS messages

This topic relates to issues associated with inputting a single, multi-byte (see note) character in a message in which all other characters are in the single-byte alphabet.

In an SMS message longer than 69 characters single-byte characters, when a single multi-byte character is entered the message will immediately be split into two multi-byte messages.

This impact on users can be explained i.e. doubling of costs and the unpredictability of the way in which this cost doubling can occur. It can also be pointed out that, this has a discriminatory effect on users from countries where the use of these multi-byte characters has a significant impact on the meaning of words.

This can be shown to be a problem for which simple changes to the terminal design will not solve the problem (as it could for the language selection issue). This can be shown to be an example of where a failure to consider and meet realistic user requirements can become a future major liability.

NOTE: Character not covered by GSM 03.38 ("Digital cellular telecommunications system (Phase 2); Alphabets and language-specific information (GSM 03.38)"; several subsequent versions have been published; the latest version is 7.2.0 (1999-07), the GSM document having been reissued as TS 100 900 [i.42]).

The significant tasks will be:

- To edit and send an SMS message using only single-byte characters, send it to another user and examine its send and delivery attributes;
- To edit and send an SMS message using only single-byte characters but adding one multi-byte character, send it to another user and examine its send and delivery attributes;
- Discuss the outcome.

9.2.2 Session 2: Seamless networking

9.2.2.1 Identification of available and selection of preferred communication access network

Subscribers of mobile communication services have traditionally had continuous access to a set of well-known, well-configured and without disruptions always available services, at a well-defined cost. This is no longer the case, with the advent of 3G networks, complemented by wireless broadband access, ad-hoc networking and fall-back infrastructure networking with GSM and GPRS.

The attendees will be asked to explore the way in which the below operations are supported in different phones. In particular, a person from a terminal manufacturer can be asked to try to access this significant functionality on an example of one of their own terminals and also a random terminal from another manufacturer. Also, non-manufacturers could be asked to try these functions on their own personal terminal and a random other phone of a different make.

Multi-network access enabled PC cards may also be used:

- Identify the available mobile and broadband networks;
- Identify their attributes, e.g. openness/availability, maximum transmission rates and related costs (e.g. rate packages, etc.);
- Access or log on to these networks, if possible;
- Compare expected and experienced transmission rates and quality-of-service attributes;
- Leave the ETSI Einstein building you are in, take a 3-minute walk outside. Come back, go to www.etsi.org and guess what network infrastructure you are using;
- Turn off your terminal and turn it on again. Go to www.mobil.se. Can you estimate the time and cost to download this page?
- You have decided to log on to and stay on the ETSI Public Wi-Fi network until you take further action. Is this setting supported by your terminal?
- Did you access a Wi-Fi network at the hotel you are staying at? Were you able to log on with available credentials from your mobile operator? Was it easily achieved? Was the experienced quality according to your expectations?

9.2.3 Session 3: Multimodal communication

The intention here was to look into the issues of how seamless communication between different forms of services (voice, video, text, etc.) can be achieved with the emerging technologies across a variety of platforms (e.g. both fixed and mobile) to enable rich communication experiences that would be of benefit to a wide range of users including those with disabilities.

9.2.4 Session 4: Assistive device connectivity

9.2.4.1 Introduction

The attendees will be offered the possibility to explore the way in which common user operations are supported in different mobile phones. In particular, people from assistive device manufacturers can try to access these common functionalities on a wide variety of phones. Also the mobile phone manufacturers can try these functions via assistive devices.

About 50 different phone models will be available for testing, giving assistive device manufacturers a great opportunity to perform interoperability testing. Phone manufacturers will also be able to note difficulties, and thus be able to improve the accessibility of their products.

More information about our work can be found here:

http://portal.etsi.org/STFs/STF_HomePages/STF304/STF304.asp

We also invite you to participate in the stakeholder consultation, by filling in the appropriate form found here:

http://portal.etsi.org/STFs/STF_HomePages/STF304/STF304.asp#stakeholder_consultation

If you wish to attend this workshop, please register by clicking on http://www.etsi.org/plugtests/Upcoming/HF/Registration.htm, not later than April 15. Please also send us an e-mail to atmobile@etsi.org where you state what kind of mobile assistive device or mobile phone, if any, you will bring to the workshop.

9.2.4.2 Testing procedure

Testing will be done by executing three scenarios. During a scenario, the tester will execute the steps of the scenario.

For assistive device manufacturers, each scenario will be executed one time for each mobile phone types chosen as subject for test.

For mobile phone manufacturers, each scenario will be executed one time for each assistive device types chosen as subject for test.

During each test session, a form will be filled in with information on success or failure, and possibly, reasons for failures be noted.

9.2.4.3 Scenarios

During the workshop, common user operations will be explored in three scenarios:

1) Using the assistive device to call a number in the phonebook stored in the mobile phone.

2) Changing the ring tone of the mobile phone from a assistive device.

3) Sending an SMS from a assistive device connected to a mobile phone.

The success of these scenarios depends largely on the implementation on the mobile phones of the following AT commands:

- +CPBF (find phonebook entry);
- +CPBS (select phonebook storage);
- +CPBR (read phonebook);
- +CRMC (ring tone control); and
- +CMGS (send SMS).

If these AT commands are not available, it may be possible to perform the same task by emulating key presses on the mobile phone from the assistive device. Successfully connecting the assistive devices to the phone is also of crucial importance.

Task 1: Call a contact in the phone book

Scenario 1: Using the assistive device to call a contact in the phonebook stored in the mobile phone.

- Connect the assistive device to the mobile phone.
  - If it is not possible to connect the device to the mobile phone, try to determine why.
- Locate the phonebook entry.
  - If it is not possible to locate the number in the phonebook. Try selecting a different phonebook storage (+CPBS).
  - If it is still not possible, dial a number manually from the assistive device.
- Note how the phonebook entry was found; by controlling the keypad on the phone from the assistive device or if the whole process was performed on the assistive device.
- How easy was it to call a number in phonebook on the phone from the assistive device on a scale from 0 to 5? (Where 5 = very easy and 0 = impossible.)
- Dial the number from the phonebook entry.

Task 2: Changing the ring tone

Scenario 2: Changing the ring tone of the phone from a mobile assistive device.

- Connect the mobile assistive device to the mobile phone.
- If it is not possible to connect the device to the mobile phone, try to determine why.
- Change the ring tone of the mobile phone using the mobile assistive device.

- If it is not possible, determine if it is due to technical difficulties (e.g. problems with AT commands) or user difficulties.
- Note how the ring tone was changed; by controlling the keypad on the phone and browsing the menus, or from the assistive device directly.
- How easy was it to change the ring tone on the mobile phone from the assistive device on a scale from 0 to 5? (Where 5 = very easy and 0 = impossible.)

Task 3: Sending an SMS

Scenario 3: Sending an SMS from a mobile assistive device connected to a phone.

- Connect the mobile assistive device to the mobile phone.
- If it is not possible to connect the device to the mobile phone, try to determine why.
- Send an SMS using the mobile assistive device.
- If it is not possible, determine if it is due to technical difficulties (e.g. problems with AT commands) or user difficulties.
- Note how the SMS was sent; by emulating keys on the mobile phone to browse menus and typing the SMS or by writing the SMS on the assistive device.
- How easy was it to send the SMS on a scale from 0 to 5? (Where 5 = very easy and 0 = impossible.)

9.2.4.4 Final discussions on the outcome

The outcome of the three usage scenarios will be discussed.

9.2.5 Outcome and conclusions of Day 2

9.2.5.1 The selection of sessions

As was originally planned, the content of the sessions and the overall number of them was dependent on:

- the skills and experience of the attendees;
- the topics that these attendees considered to be most valuable.

One session that could not be run was session 4, on "Assistive device connectivity", was completely dependent on the attendance of assistive device manufacturers bringing both their expertise and their products to the event. Despite extremely persistent attempts to convince these manufacturers of the benefits of coming to the event to talk to representatives of the mobile communications sector and to try out the ease or difficulty in connecting to a variety of mobile devices, none registered for the event. One of the disincentives for these, often small, companies is the cost of coming to even a single day of a Plugtest event. Even thought there was an agreement that no costs would be levied to participate in the event, the other costs associated with attending e.g. (flights, hotels, meals, days of normal work lost) would often be a major burden for such companies with prospects of an equivalent business benefit being hard to guarantee.

Figure 4: One of the Day 2 sessions

As the majority of the attendees had a strong interest in the "Total Conversation" theme of Day 3 (see clause 9.3) it was decided that both the seamless networking and multimodal communication would be combined into an early examination of the capabilities of one of the potential systems to be addressed in Day 3.

9.2.5.2 Generating SMS messages in another language and changing SMS language settings - outcome and conclusions

Many of the delegates of the mobile messaging session had responsibilities for the user interfaces of their company's products, which meant that they were already familiar with the complex issues associated with language and cultural adaptation of products to different users and different markets. The session started with a presentation that introduced the audience to ETSI's work on "EG 202 421 [i.18]:"Human Factors (HF); Multicultural and language aspects of multimedia communications" - the work undertaken by STF287. After the presentation there was a discussion on some of the practical issues associated with language and culture related features and settings. The two areas that were discussed were those presented in clauses 9.2.1.1 and 9.2.1.2.

This was followed by a practical session where a wide range of mobile terminals was made available to the delegates. These terminals were from a wide range of manufacturers and many were of novel, unfamiliar and sometimes unreleased designs. A questionnaire, that challenged the participants to try to locate and use various language related features of both familiar and unfamiliar products, was administered to all of the delegates. The delegates were asked to carry out a few language related tasks on both their own terminal and one of the provided terminals with which they were not already familiar. Delegates from terminal manufacturers were encouraged to select terminals produced by a competing manufacturer.

The delegates were asked to find out:

- if there is a named option to change the terminal's language setting in the terminal's main menu and what the option was called;

- if there was no language option in the main menu the delegates were asked to predict which main menu option they would expect to use to access the language change functionality -then to experiment with the terminal to see if their predictions are correct;

- they were finally asked to record under which actual main menu option language changing was located.

The delegates were then asked to predict where they would expect to see the option to change the text messaging language and then asked to find where it actually was and what the option was called. They were then asked to document how many steps it took to change the text messaging language using the correct method of accessing these functions.

What became very apparent from this session was that even very experienced mobile terminal manufacturer and service provider delegates had major difficulties with operating unfamiliar mobile terminals. Even the task of switching on some of the terminals was a problem that required the help of an assistant to solve. Some further problems related to the fact that a few of the terminals were set up for the local, to ETSI in Sophia Antipolis, French settings.

Once the terminals were switched on, and when a SIM was present, the delegates still often found locating the language settings difficult and did not find them where they expected them to be. Locating the options to change the text message language was an easier task for most delegates and was an option that was easily available when composing a message on most of the terminals.

In a discussion session after the trials with the mobile terminals, the following issues arose:

Most of the delegates could see the benefit of a mechanism that could switch the text messaging language according dependent on to whom the message was being sent. This was a feature that was identified during the work of STF287. This capability can be realized if language information is associated with individual contact records in a person's terminal -based or online contact book.

- The issue of how language options should be presented in menus presented to users was discussed. The entire meeting agreed that for the main product language selection menu the name used for each language should be the name used when using that language e.g. English, Français, Svenska.

- The majority opinion of the delegates was that the naming of the language choices in the text messaging language selection menu should be as written in the language of language in which the terminal is currently set e.g. for a terminal configured for the English language, the above language three languages would be:

  - English;

  - French;

  - Swedish.

  There was a minority opinion that the menu options in this menu should also use the local form of the language name. The logic for this idea was that if a person was going to switch their text messaging language to another language they would understand the name of the language written in its native form. This may be true for many users, but it is certain that all users could be expected to understand the names of all languages as written in their own language.

Final conclusions related:

1) This was an interesting and revealing session. Most delegates were amused and surprised at how difficult it could be for experts to switch on and use an unfamiliar mobile terminal.

2) Finding the means to change the global language setting of an unfamiliar mobile terminal could be surprisingly difficult, if not impossible task. Even locating this option on a person's own terminal could be quite challenging.

3) Finding the text messaging language selection option was a fairly simple task in most cases.

4) Having a preferred language stored with an individual contact record in a contact book was seen to be an interesting and valuable approach to permit the text messaging language to be automatically set according to whom the message was being sent.

5) There was unanimous agreement that the names of languages in the global language setting menu for a mobile terminal should be written in the standard way for that language e.g. English, Français, Svenska.

The significant majority of the delegates agreed that the text messaging language selection menu of a mobile terminal should be presented according to the overall language setting of the terminal e.g. for a mobile terminal configured for the English language, the above language three languages would be presented as:

- English;
- French;
- Swedish.

9.2.5.3 Issues related to multi-byte characters in SMS messages - outcome and conclusions

Despite the fact that most of the attendees of this session were experienced people from the major mobile handset manufacturers and operators, many were completely unaware of the issue about how messages with a mixture of single- the user perspective, such unpredictability was very undesirable.

This session served to educate those who attended to a problem which has been little discussed but has existed since SMS was first deployed. As a problem it will become increasingly visible as the range of languages supported in mobile phones continues to increase and as mobile phone usage in the emerging markets also increases.

Prior to this session TC-HF had sent a liaison to 3GPP alerting them to this issue and identifying how this problem is likely to be increasingly visible. The current situation is that this issue has now been generally accepted as important and now operators are also asking 3GPP to find a solution that will help their subscribers.

9.2.5.4 Multimodal communication - outcome and conclusions

This revised session, with its focus on examining the user experience that a Total Conversation service can bring to users generated a great deal of interest. For many people this was their first experience of seeing such a service offer simultaneous voice, video and character by character text communication. This latter feature is very different from the block at a time experience of today's text chat systems and is much closer to the free flowing easy interrupting style of voice communication. This form of free flowing text communication is what those deaf people, who use their special text communication terminals, are currently used to.

This demonstration and the ensuing discussion provided a very valuable lead-in to the day 3 session as it brought those people who had little experience of what the user experience of a Total Conversation system could be an opportunity to see it demonstrated very thoroughly. The demonstration involved multiple terminal types, different network and application types and yet still provided a very seamless communication experience. This is precisely what the original plans for the seamless networking and multimodal communication sessions were intended to investigate.

The overall conclusion of this session is that all the attendees were shown how seamless multimodal communication could work in practice and were also assured that it could be a very pleasant and effective user experience for all users irrespective of any disabilities that they might experience.

9.3 Day 3: Accessible mobile and web-based conversational services

For some time, disability organizations have been concerned that the communication options that they were offered varied significantly from country to country and, even when good options existed in one country, they did not interwork across national boundaries. This issue has been particularly highlighted in terms of the number of incompatible text communication systems that were provided for deaf users in the different countries of Europe.

In the mean time, as the possibilities offered by main-stream technologies developed, some of the obvious benefits these provide and functions they support (e.g. mobility, variety of device choices and options, functional device integration) were added to the list of user requirements.

The "Inclusive Communication" (INCOM) sub-group of the European Communication Committee" (COCOM) had specifically been pushing for a solution to these incompatible text communication systems. One approach that addresses this issue, as well as offering a richer communication for all people, is the "Total Conversation". This, as explained below, can offer a system that enables all users to communicate using the modes of communication that they prefer or, in terms of people with disabilities, with the methods which they are able to use. Such an environment is potentially a perfect example of a truly inclusive solution. This approach is one that the European Commission finds very promising and the Commission representative at the Plugtest event attended with a wish to see some practical progress made.

Daniel Quintart from the ICT for Inclusion - Unit (H3) of the European Commission's DG InfoSoc- opened the day with a very informative presentation of the role and priorities of the European Commission. He looked into the history of the Commission's approach to enabling realtime text and speech services. He described the two working groups of TCAM:

1) eWGD 1 which focused on real time conversation and interoperability of equipment; and

2) eWGD2 which focused on accessible user interfaces with the task to produce an industry roadmap for implementation of these accessibility features in mainstream products.

He described how the final report of TCAM failed to meet the objectives of the working groups and that the mandate given to the eWGD was suspended. He identified the need to:

- strengthen the right of disabled users to access 112 with any medium and mode of communication;
- strengthen Caller Location Obligations;
- introduce a Community Mechanism to address *e*Accessibility issues;
- facilitate agreement on "Common Requirements".

Figure 5: The European Commission representative introducing the topic

There is a review of the regulatory framework with a proposal to amend the legislation in 2007, with full entry in force in 2010. So the question remains as what to be done in the meantime?

Amongst the various approaches, Daniel introduced the European Commission's Competitiveness and Innovation Programme (CIP) - a 3.6 B€ new programme to boost growth and jobs in Europe. There are calls for proposals on a number of topics e-Inclusion. The aim of the programme is to drive forward innovation through the adoption and best use of ICTs. There are Calls for Proposals for types of Pilot (A and B) and Thematic Networks. This programme is beyond R&D as it is a deployment programme. There are type B Pilots for Accessible Interactive Digital TV and ICT for ageing well and Thematic Networks for ICT for active ageing at work, ICT for enhancing social integration and cultural diversity and an eInclusion innovation platform. One of the future themes to be discussed is on the topic of Accessible Convergent Communications (Total Conversation) as a possible Type B Pilot (i.e. a first implementation of an ICT based innovative service carried out under realistic conditions). The objective of this pilot is to improve accessibility to communication provided via mainstream terminals and services. The scope of the project is to be decided but was described as broadly: Multimedia Communication/Total Conversation: real-time conversation technology combining text, voice and video, exploiting the possibilities of new network environment, services and terminals (including accessibility of Emergency services as an urgent need).

This potential requirement for an EC CIP programme formed a major focus of the final discussion phase of the workshop. The demonstration that was undertaken at this event was discussed and all agreed that it showed a very encouraging picture of the potential to have interworking between total conversation systems based on very different technical solutions, while examining the possibility of mainstream technologies to provide the support for total conversation in the future. Daniel Quintart stated how pleased he was to be able to witness this level of interworking and was interested in seeing how this could be taken forward. The meeting rapidly converged on the desirability and practicality of creating a CIP Type B pilot involving the different solutions that were demonstrated at the workshop, including the 3G-based solutions. The different parties involved were all very positive on the practicality and desirability of moving forward with a project proposal and expressed a wish to bring this forward.

During the rest of the day, there were presentations and demonstrations of various approaches to the aim of "Total Conversation" which incorporates support for simultaneous text, speech and video communication. Users can also use different combinations of these communication modalities. One configuration tested during the session was as shown in figure 6.

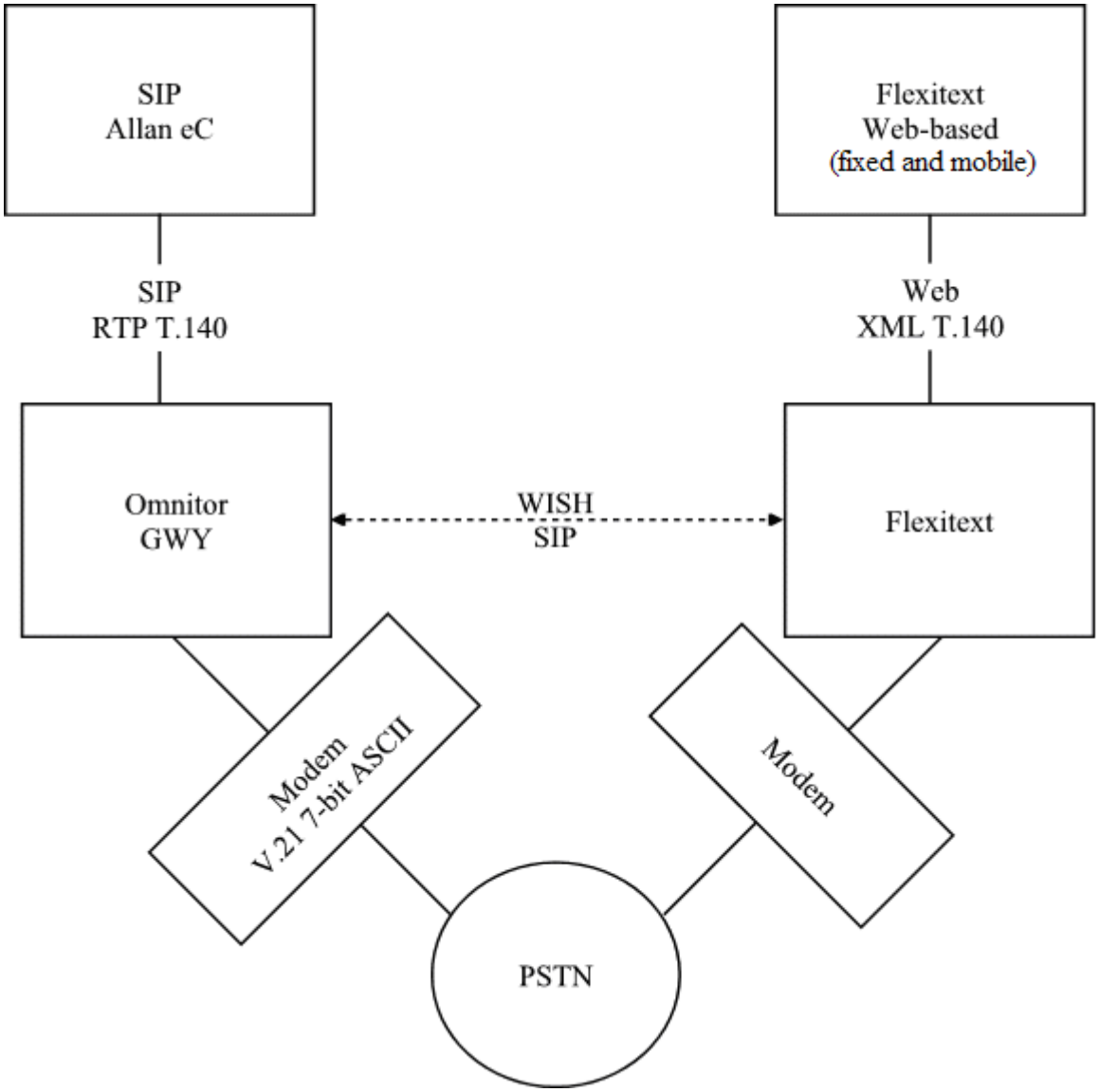

Figure 6: A configuration used to test text telephony interoperability between multi-mode systems

A system described and demonstrated was the one offered by Omnitor, called Allan eC, based on the approach that is documented in EG 202 320 [i.34] "Human Factors (HF); Duplex Universal Speech and Text (DUST) communications". This system permits user to user communication in any combination of the three media. It is also suitable for accessing or equipping a video relay and a video and text relay service as well as emergency services. Interoperability with text telephones is achieved either directly through a modem or through a text gateway accessible through the IP network.

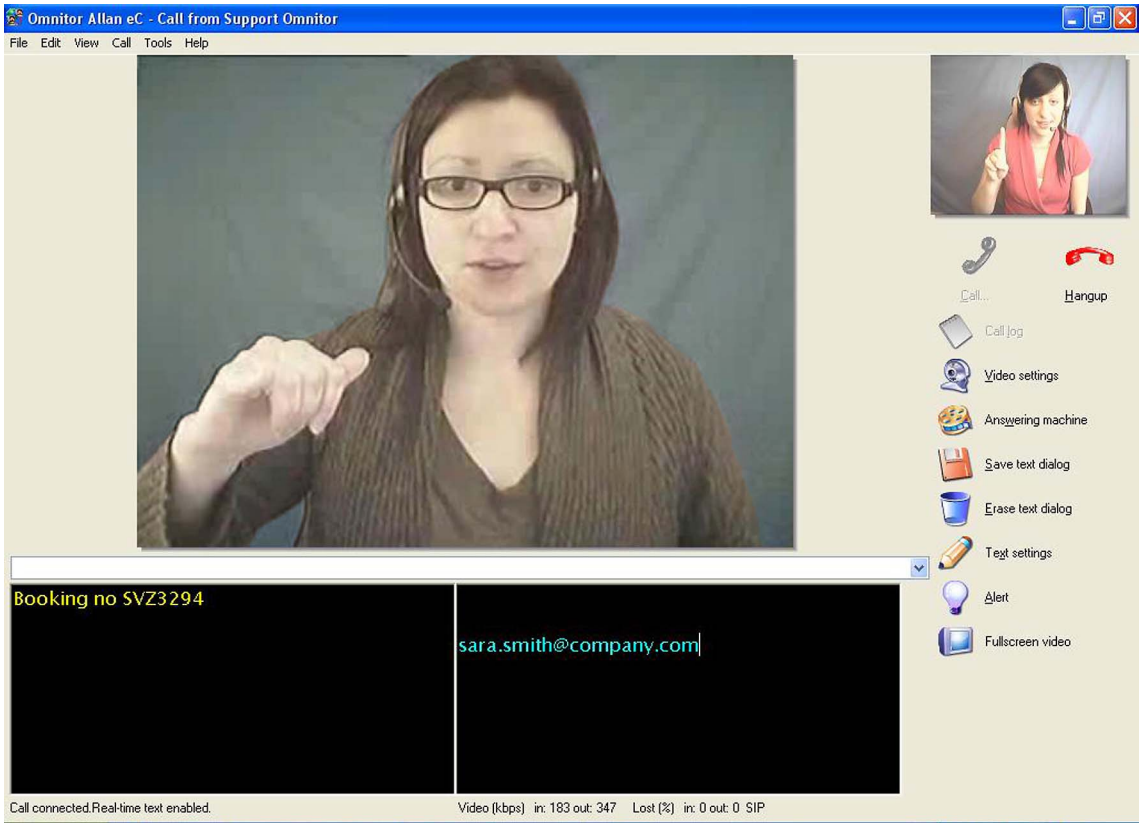

Figure 7: Screenshot of a Total Conversation system (Allan eC)

A number of implementations of the DUST concept were tested and demonstrated. All used the call control protocol SIP as the base and RFC 4103 [i.43] for the real-time text part. Participating in this demo and trial were the Omnitor Allan eC total conversation softphone, the open source text and voice softphone SIPcon1, the Asterisk open source IP-PABX with fresh additions for real-time text by Aupix and Omnitor, the soft textphone Talk-by-text from RNID and the Total Conversation hardware videophone AP-100 from Aupix. The latter participated from Bristol, UK, in a very successful interoperability demonstration with the Allan eC softphone in Sophia Antipolis. Interworking using audio, video and RFC 4103 [i.43] text communication was achieved. A demonstration of the usefulness for a combination of sign language and text was done with a call to Sweden. These products are currently deployed and form an emerging interoperable Total Conversation network.

There was also a successful demonstration of an Omnitor Allan eC system talking to Ericsson's Flexitext system through their respective text telephony gateways that impressed the delegates.

Interworking between the RNID Talk by Text system, Allan eC, SIPCON 1 Trace/Omnitor and, in Sweden, a SIP based touchscreen videophone was demonstrated (although some characters were lost during the communication, due to unknown reasons).

Later in the session, there were demonstrations of individual systems and ad-hoc interworking between them, and good discussions of some details and features of real-time text communication took place.

Ericsson introduced and demonstrated their Flexitext system that uses T.140 [i.47] over XML and accesses a profile stored in a server from a computer through a web client, or from a mobile phone. This server-based solution can be made available for most GPRS/EDGE/3G (UMTS)- compatible handsets. After the instant download (over the air or a computer connection) and installation of a small, specific Java client to the terminal. This approach illustrates how main-stream, mass-market technologies and devices can be made to support required services, while in the mean time offering all benefits of mass-market systems and devices. An ETSI Technical Specification covering this approach is under development (DTS 102 575, "Human Factors (HF): Mobile and Web-based Text Telephony Clients; Requirements and Specification)". The product is currently deployed and used in several countries (including Sweden), where Relay and Emergency services are also provided through it:

- In Denmark, in an IP based service, 40 % of users were accessing it via the internet or by mobile and this is predicted to rise to 60 % by the end of 2008.

- In Germany 80 % of the accesses are from the Internet, in pilot testing in Sweden 20 % calls to the text relay service come from the web. The system is based on a client which is downloaded from the Internet onto the mobile terminal. It is a server based system and uses gateways to connect to existing PSTN text phone services. There are no direct person to person calling services, calls are placed via the text relay service.

- In Norway an IP based real time service has been trialed and will be available from 2008. It is based on a Web client. Because it is based on a true character by character dialogue it is not suitable for mobile as, in Europe, people want to use the phone keypad and the predictive text based on the inbuilt dictionary (available in an increasing number of languages, also as multi-language implementations) to greatly improve their text entry speed.

Therefore, for systems designed for use from mobile phones it is appropriate to base the text entry dialogue on a word-by-word model (rather than the traditional character-by-character), because of the almost universal adoption of predictive text input functionality, applicable to both real time text and voice applications, as well as conventional text messaging.

Continuing the discussions, it was re-stated that, in Sweden, the Emergency services handle calls from text phones, making use of the Swedish relay service. The meeting agreed that the aim of any future real time text and speech system should be backward compatibility to legacy text phones. However, the new generation of ICT users growing up with the Internet, the Web and interoperable mobile communication systems supporting devices with capabilities such as voice, video and text calls in addition to Internet access, email, chat, multimedia messaging, personal information management applications, imaging and video will most probably demand other solutions than legacy text phones with limited capabilities.

Figure 8

Figure 9

Figure 10

Figure 11: Void

Figures 8 to 11: Intensive activities during Day 3 of the Plugtest

The overall summary and main conclusion of the day was that it was very successful, even if it became more of a demonstration than a test. The picture on interworking between different total conversation systems, based on a range of different technical solutions, was very encouraging and that this positive feeling should be taken forward towards realizing deployed solutions by means of a CIP Pilot on the topic.

Daniel Quintart stated how pleased he was with the outcome of the event and that "***more progress had been made in the one day than in the last two years (of TCAM)".***

10 Challenges, achievements and lessons learned

10.1 The challenges in running a User Experience Interoperability event

10.1.1 Availability of attendees

One of the challenges in running any interoperability event related to the user experience of ICT products and services is the size, distribution and status of the groups of potential participants within technology and particularly telecommunications companies.

Until the 1990s (when the monopoly of the PTTs ended), there were a relatively small number of companies that produced ICT products and services that were used by all members of the public on a daily basis. These companies were typically large state monopoly telecommunications providers and a small number of mobile telephone and Personal Digital Assistant (PDA) manufacturers. Very many of these large companies had a section of the company exclusively devoted to improving the user experience of their customers. Typically this would be a large Human Factors unit within the company. Even where this function was distributed within a company, the budgets available were typically large.

The current marketplace for 3G and Mobile Broadband products and services is very large, very diverse and very competitive and fast moving. Many of the larger companies have either disappeared or have become smaller and also more commercial. In addition, many of the products that are available in this marketplace come from low-cost manufacturers in the Far East. In this current world, the people who have responsibility for the User Experience of products and services are now spread more thinly across a much larger range of companies. This means that some companies (e.g. smaller mobile operators) may rely on manufacturers and service providers to provide them with products which have been optimized to deliver the best user experience. Also, the size of the user experience teams within those companies that have them is now much smaller.

The situation is even worse to SMEs, where resources often focused on day-to-day operations and cannot easily be dedicated to such activities.

The consequences of these changes in the marketplace is that it is now very difficult to attract those people with responsibility for product and service user experience as they either do not exist in some companies or they cannot be spared to attend a multi-day event unless the payback of attending such an event justifies the weakening of the user experience team's effectiveness during their absence and compensates for the considerable investment required.

10.1.2 The effect of a competitive marketplace and associated costs

Many of the back-end technologies, around which many ETSI Interoperability events are run, are technologies that all of the companies in the marketplace require in order to operate their services. Achieving fully interoperable realizations of these technologies is a common interest of all the players in the marketplace.

The very high level of competitiveness within the marketplace means that many companies view the user experience as their principle area for product differentiation and, hence, market success. It is therefore not obvious to these companies that demonstrating any level of consistency between the user interfaces of the products and services of different companies is of benefit to their company. They also fear exposing any weaknesses or innovative solutions too early to competitors.

Earlier ETSI work to produce EG 202 132 [i.2] on "Human Factors: Guidelines for Generic Mobile User Interface Elements for Mobile Terminals and Services" was able to demonstrate the benefits of having a minimum level of common user interface consistency, as this reduced the need for companies to develop unique solutions in areas that had low value in terms of product differentiation. There was also the potential benefit for these competing companies to save costs, shorten development times and increase the quality by being able to purchase standard off-the-shelf hardware and software components that provide some of these commonly agreed features. Unfortunately, only a minority of the potential attendees of the ETSI User Experience event are sufficiently aware of these potential benefits to realize that similar beneficial results could potentially come from attending a User Experience Interoperability event with their competitors.

The ultimate question that any potential attendee of a user experience interoperability event has to answer is "What benefit does attending this event give to me?" It is clear that with all of the above constraints acting against attendance, "Being part of an imitative that brings good overall outcomes to society", which the organizers believe may have been a potential outcome of the event, would not be an adequate answer, in spite of the generous removal of any attendance fees for the event.

10.1.3 The involvement of disability advocacy groups

Some of the user experience work undertaken within ETSI relates to the eInclusion of people with disabilities with the rapidly growing diverse range of 3G and multimedia products and services. An interoperability event is a potentially valuable opportunity to involve people with disabilities, or people from groups representing people with disabilities in the interoperability activities. However, a major barrier to such involvement is the very low budgets that organizations representing people with disabilities have. Such organizations do not typically have extremely low budgets to cover travel to external events in other countries, and these budgets. The costs involved in travelling to and attending a multi-day event in the South of France is usually a major challenge for such organizations. Any additional costs for attendance, as are normally charged for ETSI interoperability events, would be a further significant factor in making attendance of an ETSI interoperability event impractical.

11 Outcomes, conclusions and recommendations

11.1 Outcomes

11.1.1 October 10-13, 2006 and January 23-26, 2007 event attempts

All of the above limitations were understood when planning the interoperability event scheduled for October 10-13, 2006 and January 23-26, 2007. However, shortly before the end of the registration deadlines, there were fewer than 10 people registered for the events.

It had become clear that an event in the originally planned format, particularly one that charged participants considerable fees in addition to the loss of work hours and the coverage of travel expenses for attending, was not attracting potential participants (including micro, small and medium enterprises).

11.1.2 April 24-26, 2007 event

For this event, it was decided to make the first day of the event into a one-day conference. This day was to have contributions from non-ETSI speakers as well as papers related to the results and ongoing activity of many of the relevant activities being pursued in Specialist Task Forces (STFs) run by the ETSI Human Factors Committee. This approach was an attempt to provide a tangible output that attendees could take from the event, instead of only sessions that required the attendees to contribute by participating in testing situations. It was hoped that most attendees would see a benefit in hearing about such a large amount of relevant work being done in ETSI. It also offered a good opportunity for the STFs to downstream their findings to a very appropriate audience.

The second day was primarily designed according to the plans similar to those of the April event.

The final day of the revised event was a session that offered both interoperability testing and a discussion session on a single focussed topic - the concept of "Total Conversation" which can combine real-time fully duplex text communication with simultaneous voice and video communication.

11.1.3 Conclusion from the April 2007 Plugtest event

The April event managed to attract a very respectable number of attendees. It became clear that the number of attendees was high because of two factors:

- The number of attendees for the first day was high partly because this conference day contained many presentations and each presenter was also an attendee who listened to the other papers.
- The number of attendees of the third day was because of a genuine interest shown in the topic by industry, disability advocacy groups and the European Commission. Some reasons for this interest are given below.
- Feedback from the attendees suggests that the number of attendees for the second day was high primarily because of the interest in days one and three ensured that people attended for all three days.

From the above, it is clear that success of an interoperability event, as opposed to a small conference, depends on a topic that attracts enough interest.

The interest in Total Conversation existed before the planning of this event. The origin of this interest arose primarily from two factors:

- The strongly expressed concern from disability advocacy groups that the existing national text communication systems for deaf users within Europe are incompatible with each other and do not provide an adequate European solution - let alone a global solution.
- The interest shown by a number of disability advocacy groups and commercial companies in developing a new communication medium that offers the existing benefits of text communication plus additional features that offer a much better communication experience that would allow users with a range of disabilities to participate in a communication environment that was popular and used by all other people.

Prior to this event, there was no agreement between those who were involved in developing Total Conversation solutions on how a fully interoperable European solution could be achieved. This event offered a unique opportunity to demonstrate interoperability between different systems and to explore a consensus approach to a future development path for a European Total Conversation environment, by focusing efforts on the functional requirements and the related end user needs.

Efficient interoperability is a crucial challenge within ICT and the launch of INTEROPOLIS acknowledges the complexity of ICT standardization, which increasingly comprises not only of multiple technologies but also of multiple organizations and structures which have to cooperate with each other. Its creation draws on many years' of experience in interoperability acquired through ETSI's former Protocols & Testing Centre (PTCC) and Plugtests™.

Positioned towards the product end of the value chain, INTEROPOLIS will offer customers:

- Test methodology and development (consulting, design, development);
- Pragmatic operational interoperability initiatives (including PlugtestsTM Interop events);
- Training (testing methodologies, TTCN-3, validation best practice, test tool engineering);
- Test tool engineering (consulting, support to build solutions, promotion of open solutions); and
- Technologies validation (support and technical expertise for validation schemes).

'Whereas the ETSI Forapolis service is considered technology-enabling, INTEROPOLIS is product-enabling. This double-offering is expected to be a major step forward for all those with a stake in seeing improved ICT interoperability, such as working groups and Fora.

11.1.4 Participants and their feedback

The ETSI Plugtests™ department has distributed an inquiry, in order to log and examine participants' feedback, satisfaction and comments about the event organized.

A brief summary of the information received, based on the original information, is provided below.

30 participants from 7 countries, representing 25 different companies attended the event (in addition to the organizers), as detailed in table 7.

The assessment of the success/failure element of the survey is provided in table 6, It indicates an overall satisfaction rate of 81 %.

Table 6: Assessment of success/failure: Results of the satisfaction survey

Satisfaction of the overall organization	4.2/5
IT support	3.9/5
Facilities and in house services	3.8/5
Usefulness	4.2/5
Overall satisfaction	**4/5**

It is worth quoting some of the participants' feedback:

Gunnar Hellström from Omnitor (SE) said: **"It was very useful to get together and get a real view of available interoperable solutions!".**

Jouni Kangas from Nokia (FI) stated that the event **"Puts mo on the map of how large area the whole accessibility is".**

Dominik Roeske, representing the Federal Network Agency (DE) thought that it was a **"Very good organization, moderation, professional equipment and perfect web pages actualisation".**

Last but not least, Daniel Quintart from the European Commission (DG Information Society and Media, H3 Unit - ICT for Inclusion and INCOM/TCAM groups) stated how pleased he was with the outcome of the event and that **"more progress had been made in the one day than in the last two years (of TCAM)".**

Table 7: Plugtest participants and countries of origin

	Organization	Ctry
1	Apica IT	FR
2	Association Suisse des Télécommunications	CH
3	BENq Mobile GmbH	DE
4	BT Group Plc	GB
5	Castle Consulting Ltd.	GB
6	Chimera, University of Essex	GB
7	European Commission	EU
8	European Management Services	GB
9	Federal Network Agency	DE
10	ITS - Information Technology Standardization	SE
11	MOTOROLA S.A.S	FR
12	Net Innovations	FR
13	NOKIA Corporation	FI
14	Nokia Siemens Networks GmbH & Co. KG	FI
15	Nokia/Technology Collaboration Centre	FI
16	NORMAPME	BE
17	Ofcom (Office of Communications)	GB
18	Omnitor AB	SE
19	Ontologic	GB
20	Orange Labs	FR
21	Orange SA	FR
22	Örebro Läns Landsting	SE
23	Telecommunications User Interface Ltd.	DE
24	Telefon AB LM Ericsson	SE
25	WM Services	GB

11.2 Overall conclusions about and recommendations for future Human Factors/ user experience interoperability events

It is clear, from the previous difficulties to attract interest in the user experience interoperability events, that the original idea of formulating an event around a set of diverse user experience testing scenarios does not appear to be a format that generates the necessary interest. The considerable success of the April event, particularly its last day, points to the need to focus around a single topic that is of considerable interest.

The topic of Total Conversation was an ideal topic around which to base a user experience interoperability event, as it is a topic in which there is strong interest:

- from service developers;
- the a group of users who are currently poorly served by existing solutions;
- from a European policy perspective in these approaches to finding solutions for users who are currently badly served by existing services.

These conditions are very similar to those that lie behind the success of other ETSI Interoperability Plugtests™ events outside the user experience domain. All of these successful events have been where companies have a shared need to find an interoperable solution in order to be able to offer successful future services.

In the case of the user experience interoperability event it was possible to add the needs of user groups and policy makers who happen to share a common interest in the same set of solutions that benefit the service providers.

Last but not least, addressing the human factors and user experience aspects of any technology with an implication on end users may add a considerable value to any Plugtest. It may also show to be the most efficient way to address issues of usability and accessibility in their widest possible sense, in the same time providing immediate feedback and a hands-on experience to all event participants.

History

Document history		
V1.1.1	November 2008	Publication