

Human Factors (HF); An annotated bibliography of documents dealing with Human Factors and disability



Reference

RSR/HF-00128

Keywords

ageing, disability, HF

ETSI

650 Route des Lucioles
F-06921 Sophia Antipolis Cedex - FRANCE

Tel.: +33 4 92 94 42 00 Fax: +33 4 93 65 47 16

Siret N° 348 623 562 00017 - NAF 742 C
Association à but non lucratif enregistrée à la
Sous-Préfecture de Grasse (06) N° 7803/88

Important notice

Individual copies of the present document can be downloaded from:

<http://www.etsi.org>

The present document may be made available in more than one electronic version or in print. In any case of existing or perceived difference in contents between such versions, the reference version is the Portable Document Format (PDF). In case of dispute, the reference shall be the printing on ETSI printers of the PDF version kept on a specific network drive within ETSI Secretariat.

Users of the present document should be aware that the document may be subject to revision or change of status. Information on the current status of this and other ETSI documents is available at

<http://portal.etsi.org/tb/status/status.asp>

If you find errors in the present document, please send your comment to one of the following services:

http://portal.etsi.org/chaicor/ETSI_support.asp

Copyright Notification

No part may be reproduced except as authorized by written permission.
The copyright and the foregoing restriction extend to reproduction in all media.

© European Telecommunications Standards Institute 2010.
All rights reserved.

DECT™, **PLUGTESTS™**, **UMTS™**, **TIPHON™**, the TIPHON logo and the ETSI logo are Trade Marks of ETSI registered for the benefit of its Members.

3GPP™ is a Trade Mark of ETSI registered for the benefit of its Members and of the 3GPP Organizational Partners.

LTE™ is a Trade Mark of ETSI currently being registered

for the benefit of its Members and of the 3GPP Organizational Partners.

GSM® and the GSM logo are Trade Marks registered and owned by the GSM Association.

Contents

Intellectual Property Rights	4
Foreword.....	4
1 Scope	5
2 References	5
3 Abbreviations	5
4 Standards, recommendations and reports	5
4.1 ETSI documents	5
4.2 CEN documents.....	19
4.3 ISO/IEC documents.....	19
4.4 ITU-T documents	23
4.4.1 E series Recommendations	23
4.4.2 F series Recommendations	25
4.4.3 P series Recommendations	26
4.4.4 Z series Recommendations	27
History	28

Intellectual Property Rights

IPRs essential or potentially essential to the present document may have been declared to ETSI. The information pertaining to these essential IPRs, if any, is publicly available for **ETSI members and non-members**, and can be found in ETSI SR 000 314: "*Intellectual Property Rights (IPRs); Essential, or potentially Essential, IPRs notified to ETSI in respect of ETSI standards*", which is available from the ETSI Secretariat. Latest updates are available on the ETSI Web server (<http://webapp.etsi.org/IPR/home.asp>).

Pursuant to the ETSI IPR Policy, no investigation, including IPR searches, has been carried out by ETSI. No guarantee can be given as to the existence of other IPRs not referenced in ETSI SR 000 314 (or the updates on the ETSI Web server) which are, or may be, or may become, essential to the present document.

Foreword

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

1 Scope

The present document provides a listing of standardization documentation relevant to Telecommunications on the subjects of Human Factors and disability and gives a brief outline of the content of the listed standards that are published and provides some comments on their applicability.

The present document is a living document which will be updated at intervals.

2 References

As the document is itself a listing of reference documents, it contains no specific references.

3 Abbreviations

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

AT&T	An American Company named AT&T
CEPT	Conférence des Administrations Européennes des Postes et Télécommunications
CLI	Calling Line Information
DTMF	Dual Tone Multi-Frequency
ETNS	European Telephony Numbering Space
GSM	Group Special Mobile
HMI	Human Machine Interface
ISDN	Integrated Services Digital Network
MIA	Multiple Index Approach
MIRS	Multimedia Information Retrieval Services
MMI	Man-Machine Interface
MML	Man-Machine Language
NTT	Nippon Telegraph and Telephone Corp
PBI	Phone Based Interface
PBX	Private Branch Exchange
PSTN	Public Switched Telephone Network
SDL	Specification and Description Language
TETRA	Trans-European Trunked Radio
TMN	Telecommunications Management Network
UPT	Universal Personal Telecommunications
VDT	Visual Display Terminal

4 Standards, recommendations and reports

4.1 ETSI documents

ETR 029 (October 1991): Human Factors (HF); Access to telecommunications for people with special needs. Recommendations for improving and adapting telecommunication terminals and services for people with impairments

ETR 029 identifies some of the main factors that can inhibit the access to and use of telecommunications services by people with special needs, such as those caused by advanced age, temporary or permanent physical disability, intellectual impairment, lack of education or membership of a cultural or linguistic minority group.

It is an early report which has now been superseded by EG 202 116 which incorporates much of its content.

ETR 039 (March 1992): Human Factors (HF); Human Factors standards for telecommunications applications

An early bibliography, now well out of date.

ETR 051 (December 1992): Human Factors (HF); Usability checklist for telephones - Basic requirements

A short report demonstrating the use of a simple usability checklist for the very basic operations of setting up and clearing a call on a simple telephone.

ETR 068 (September 1993): Human Factors (HF); European standard situation of telecommunication facilities for people with special needs

ETR 068 sets out to review the situation on standards and facilities for people with special needs in the major European Countries. The methods used for the document survey are reported and some attempt is made to predict future telecommunications trends. The report provides a somewhat out of date view of the facilities available and makes proposals for further standardization work.

ETR 070 (June 1993): Human Factors (HF); The Multiple Index Approach (MIA) for the evaluation of pictograms

A report describing one method of assessing the value of pictograms. It gives a reasonably detailed description of the experimental procedures and gives an example of the use of a questionnaire for the evaluation of pictograms for use with videotelephones.

The report gives no guidance on mathematical treatment of the results.

ETR 095 (September 1993): Human Factors (HF); Guide for usability evaluations of telecommunications systems and services

A useful and detailed discussion on the concept of usability. The report provides definitions and descriptions of the evaluation process. Descriptions of a number of methods of evaluating usability are provided and their advantages and disadvantages discussed. Measurement theory and scales are described.

It provides a useful introduction to the field of work for anyone needing to assess the usability of a system and gives a number of references for further study. ETR 095 has now been updated by EG 201 472.

ETR 096 (August 1993): Human Factors (HF); Phone Based Interfaces (PBI), Human factors guidelines for the design of minimum phone based user interface to computer services

A very basic introduction in general terms to the use of a telephone with DTMF keypad for services with a voice response.

ETR 113 (October 1993): Human Factors (HF); Results of an evaluation study of pictograms for point to point videotelephony

ETR 113 gives the results of an evaluation study of pictograms for use in videotelephony. It was used to justify the effectiveness of the Multiple Index Approach for evaluation. Unfortunately the results are only as good as the design of the restricted number of original sets of pictograms offered for testing. The work was the basis for ETS 300 375.

ETR 116 (June 1994): Human Factors (HF); Human Factors guidelines for ISDN - Terminal equipment design

ETR 116 has now been superseded by EG 202 116 where its contents have been largely reproduced and expanded. It is a vade mecum and checklist for all of those aspects of a design that affect the user. ETR 116 was the chef-d'œuvre of the ETSI Human Factors group and covered most aspects of terminal design.

ETR 131 (June 1994): Terminal equipment (TE); An investigation into the need for standardisation in the area of stored voice services

ETR 131 reports a study into a range of services which make use of stored voice. The description "Stored Voice Services" was first used in this report which identified the need for guidelines on user procedures and dialogues and on their usability.

ETR 147 (September 1994): Human Factors (HF); Usability checklist for Integrated Services Digital Network (ISDN) telephone terminal equipment

ETR 147 provides a simple list of features of terminal design that should be checked to determine whether human factors aspects have been properly dealt with in a design.

It should be useful both to designers and specifiers of terminal equipment.

ETR 160 (January 1995): Human Factors (HF); Human Factors aspects of multimedia telecommunications

ETR 160 defines and discusses many aspects of multimedia but deals mainly with automatically provided multimedia services. It treats hypermedia issues such as links and navigation and in general provides advice on the main Human Factors problems in multimedia.

ETR 165 (January 1995): Human Factors (HF); Recommendation for a tactile identifier on machine readable cards for telecommunications terminals

ETR 165 presents the results of tests of tactile identifiers on a number of machine readable cards. The results condemned the British Telecom phone cards then in use and a CEN TC 224 draft proposal. The design was subsequently superseded by a different recommendation in ETS 300 767 which was adopted by British Telecom and other manufacturers.

ETR 166 (January 1995): Human Factors (HF); Evaluation of telephones for people with special needs; An evaluation method

ETR 166 is based on the checklist of ETR 051 applied to conventional telephones and adds evaluation criteria said to be appropriate for groups of people with various disabilities. It does not apply to telephones for those people so severely disabled as to need special devices or features which cannot be expected to be supplied in conventional telephones.

It is an early report which has now been superseded by EG 202 116 which incorporates and updates much of its content.

ETR 167 (January 1995): Human Factors (HF); User instructions for public telecommunications services

ETR 167 gives good advice for the design of user instructions intended to be placed on or near payphones. It contains some references to additional source material and gives a couple of (Italian) examples of instruction layouts.

ETR 170 (January 1995): Human Factors (HF); Generic user control procedures for telecommunication terminals and services

ETR 170 describes general concepts related to user control procedures and interaction with telecommunication terminals and services. A number of general rules are described and example user procedures are described in SDL format.

The report is rather theoretical, being purely generic, with no detailed recommendations for particular procedures.

ETR 175 (February 1995): Human Factors (HF); User procedures for multipoint videotelephony

ETR 175 deals with user procedures for setting up multipoint videotelephone calls, procedures for switching multipoint video signals within the framework of the switched mode, and procedures for controlling the mixture of video signals within the framework of the mixed mode.

Much of ETR 175 does little more than identify organizations working in the field. A little over two pages are on preliminary recommendations for the broad outlines of procedures. Recommendations are made for more research.

ETR 187 (April 1995): Human Factors (HF); Recommendation of characteristics of telephone service tones when locally generated in telephony terminals

A largely discredited report based generally on ITU-T Recommendation E.180 written by the author of the Recommendation. Contains the content of a putative ETS that failed its vote.

ETR 198 (October 1995): Human Factors (HF); User trials of user controlled procedures for ISDN videotelephony

ETR 198 gives the results of four European experiments in videotelephony to evaluate a set of control procedures for E.170. The experiment showed that the original procedures were defective. The report provided the basis for further Human Factors work.

ETR 208 (September 1995): Human Factors (HF); Universal Personal Telecommunications (UPT) User requirements

ETR 208 identifies types of UPT users by reference to a UPT model which was used to generate user requirements. Interaction between users and between users and tasks are described.

The report provides a detailed description of the facilities that may be provided by UPT. An annex describes a number of procedures in SDL.

ETR 261-1 (October 1996): Human Factors (HF); Assessment and definition of a harmonized minimum man-machine interface (MMI) for accessing and controlling public network based supplementary services; Part 1: General approach and summary of findings

ETR 261-1 presents the results of research to develop a harmonized MMI particularly for supplementary services. Part 1 describes the approach to the work and summarizes results from the data collected.

It sets out a useful introduction to the elements to be considered in the design of an MMI for supplementary services.

ETR 261-2 (October 1996): Human Factors (HF); Assessment and definition of a harmonized minimum man-machine interface (MMI) for accessing and controlling public network based supplementary services; Part 2: Literature review - Memory and related issues for dialling supplementary services using number codes

ETR 261-2 presents the results of research to develop a harmonized MMI particularly for supplementary services. Part 2 gives a literature review on memory and other issues related to supplementary services accessed and controlled with numeric codes.

ETR 261-2 provides a basic tutorial on memory and related issues and provides a useful bibliography of the subject.

ETR 261-3 (October 1996): Human Factors (HF); Assessment and definition of a harmonized minimum man-machine interface (MMI) for accessing and controlling public network based supplementary services; Part 3: Experimental comparison of two MMIs - Simulated UPT access and prototype ISDN supplementary services

ETR 261-3 presents the results of research to develop a harmonized MMI particularly for supplementary services. Part 3 describes the experimental comparison of two MMIs, one a phase 1 UPT simulation and the other and the other an ISDN prototype.

The experiment compared interfaces using a 12 button keypad, tones and announcements with another that also had a text display. The results were limited and somewhat inconclusive.

ETR 261-4 (October 1996): Human Factors (HF); Assessment and definition of a harmonized minimum man-machine interface (MMI) for accessing and controlling public network based supplementary services; Part 4: Experimental comparison of the effect of categorized and non-categorized formats within user instructions

ETR 261-4 presents the results of research to develop a harmonized MMI particularly for supplementary services. Part 4 describes the experimental comparison of two forms of instruction manual.

One form of manual is structured to reflect a user model of a supplementary service and the other is structured to reflect the necessary user procedures. The report is at times difficult to follow due to editorial errors in the figure and table numbering.

ETR 261-5 (October 1996): Human Factors (HF); Assessment and definition of a harmonized minimum man-machine interface (MMI) for accessing and controlling public network based supplementary services; Part 5: Experimental evaluation of the CEPT and GSM code schemes

ETR 261-5 presents the results of research to develop a harmonized MMI particularly for supplementary services. Part 5 describes the experimental comparison of CEPT and GSM code schemes used to access and control supplementary services.

ETR 261-6 (October 1996): Human Factors (HF); Assessment and definition of a harmonized minimum man-machine interface (MMI) for accessing and controlling public network based supplementary services; Part 6: Survey of existing PSTN, ISDN and mobile networks, and a user survey of supplementary service use within Centrex and PBX environments

ETR 261-6 presents the results of research to develop a harmonized MMI particularly for supplementary services. Part 6 describes the questionnaire and survey data collected in two surveys of supplementary services, one in public networks and the other in Centrex and PBX environments.

ETR 261-7 (October 1996): Human Factors (HF); Assessment and definition of a harmonized minimum man-machine interface (MMI) for accessing and controlling public network based supplementary services; Part 7: Experimental evaluation of draft ETS 300 738

ETR 261-7 presents the results of research to develop a harmonized MMI particularly for supplementary services. Part 7 Presents the results of an experimental evaluation of the harmonized MMI proposed in a draft ETS for the minimum MMI for the control of public supplementary services.

ETR 294 (August 1996): Terrestrial Trunked Radio (TETRA); Voice + data and direct mode operation; Mobile station man machine interface

ETR 294 sets out the minimum man machine interface required to gain access to and to control TETRA services and supplementary services.

It describes a standard and an expanded keypad and provides information on supplementary service codes.

ETR 297 (July 1966): Human Factors (HF); Human Factors in videotelephony

ETR 297 identifies HF issues in videotelephony and stresses the need for usability. It provides advice on many aspects of videotelephony. An annex provides recommended pictograms.

ETR 329 (December 1996): Human Factors (HF); Guidelines for procedures and announcements in Stored Voice Services and Universal Personal Telecommunications

ETR 329 provides a set of generic user commands for access to and control of any service that uses recorded voice announcements and also deals with the prompts and feedback for use with voice services, the use of tones and the provision of equivalent text.

It provides a useful introduction to these services and gives advice on the creation of a satisfactory and usable service.

ETR 333 (May 1998): Human Factors (HF); Text telephony; Basic user requirements and recommendations

ETR 333 summarizes in simple terms the basic user requirements for text telephony. It gives information on existing text telephony methods and describes the characteristics of possible alternative implementations. It also gives recommendations for the use of V.18 capable modems for implementation of text telephony in different networks.

ETR 334 (December 1996): Human Factors (HF); The implications of human ageing for the design of telephone terminals

ETR 334 gives much information on the characteristics of the elderly including demographic changes, attitudes to technology, economic resources and employment. It also gives details of most kinds of age related changes.

ETR 345 (January 1997): Human Factors (HF); Characteristics of telephone keypads and keyboards; Requirements for elderly and disabled people

ETR 345 sets out to give recommendations about the physical characteristics of telephone keypads corresponding to the requirements of elderly and disabled people.

No research results are given to support the recommendations provided.

TCR-TR 02 (October 1994): Human Factors (HF); Assignment of alphabetic letters to digits on push button dialling keypads

This document specified the assignment of the alphabetic letters to the digits on telephone keypads. It was superseded in 1996 by ETS 300 640 which later became the worldwide standard in 2002 as ITU-T Recommendation E.161

TCR-TR 023 (October 1994): Human Factors (HF); Assignment of alphabetic letters to digits on push button dialling keypads

A report formally stating that TC-HF supports option "A" of ITU-T Recommendation E161 but with no commitment to recommend any service that assumes this option.

ETS 300 375 (November 1994): Human Factors (HF); Pictograms for point to point videotelephony

ETS 300 375 specifies a set of pictograms representing eight point to point videotelephony functions.

ETS 300 381 (December 1994): Telephony for hearing impaired people; Inductive coupling of telephone earphones to hearing aids

ETS 300 381 specifies the requirements for the magnetic field to be produced at the earphone to permit satisfactory coupling to a hearing aid.

ETS 300 488 (January 1996): Terminal Equipment (TE); Telephony for hearing impaired people; Characteristics of telephone sets that provide additional receiving amplification for the benefit of the hearing impaired

ETS 300 488 specifies the electro-acoustic performance characteristics of telephones with receive amplification greater than that normally provided.

ETS 300 640 (August 1996): Human Factors (HF); Assignment of alphabetical letters to digits on standard telephone keypads

ETS 300 640 specifies which letters go on which keys on keypads for all terminals, both public and private. It is fully harmonized with ITU-T Recommendation E.161 and with ISO/IEC 9995-8.

ETS 300 679 (September 1996): Terminal Equipment (TE); Telephony for the hearing impaired; Electrical coupling of telephone sets to hearing aids

ETS 300 679 specifies the electrical and mechanical requirements for the direct electrical connection of a telephone set to a hearing aid.

ETS 300 738 (June 1997): Human Factors (HF); Minimum Man-Machine Interface (MMI) to public network based supplementary services

ETS 300 738 defines the format of the control actions required to gain access to and to control public network based supplementary services. It describes the necessary information to be provided by the network during the resultant dialogue.

It sets out to provide a complete listing of supplementary services and their codes based upon information derived from CEPT, ETSI standards and common usage. Some of the codes listed appear never to have been brought into use. No definitions are provided for the service names listed.

ETS 300 767 (July 1997): Human Factors (HF); Telephone Prepayment Cards; Tactile Identifier

ETS 300 767 specifies the form, dimensions and position of the shape cut out of the short edge of a machine readable card as a tactile identifier.

EN 301 104 (October 1998): Human Factors (HF); Human factors requirements for a European Telephony Numbering Space (ETNS)

EN 301 104 specifies the human factors requirements dealing with aspects of a European telephony numbering space. It covers those aspects of a ETNS services of importance to users of those services and to other affected users.

It provides rules for the formatting of numbers, for migrating from an ETNS service to a global service, for CLI information, call charging information, delays and linguistic difficulties.

EN 301 462 (March 2000): Human Factors (HF); Symbols to identify telecommunications facilities for deaf and hard of hearing people

EN 301 462 specifies a range of symbols to identify telecommunications facilities for deaf and hard of hearing people. The symbols derive from the work described in TR 101 767. The document does not provide any indication of preferred colours.

EG 201 013 (April 1997): Human Factors (HF); Definitions, abbreviations and symbols

EG 201 013 provides a convenient listing of those definitions, abbreviations and symbols used in documents prepared by TC HF.

EG 201 024 (May 1997): Human Factors (HF); User interface design principles for the Telecommunications Management Network (TMN) applicable to the "G" Interface

EG 201 024 provides a set of design principles for the human to computer interface of telecommunications management networks. The time criticality of networks is identified and methods are described for reducing the quantity of information to be handled. A set of symbols is recommended.

EG 201 103 (February 1998): Human Factors (HF); Human factors issues in Multimedia Information Retrieval Services (MIRS)

EG 201 103 focuses on the principles that are important for navigation in Multimedia Information Retrieval Services identified as provided by ETSI members. The guide proposes general Human Factors guidelines aimed at being applicable to a range of different services.

The document provides useful information to assist in the design of an easily usable and successful system.

EG 201 219 (March 2006): User requirements; Guidelines on the consideration of user requirements when managing the standardisation process

EG 201 219 is a User Group document giving guidance to authors of standards on how users' requirements should be taken into account during the writing process. It deals with users as users of a product or service who may be business or private users (consumers).

It lists a number of generic user requirements and calls for more user involvement in the standards making process.

EG 201 379 (December 1998): Human Factors (HF); Framework for the development, evaluation and selection of graphical symbols

EG 201 379 is intended to provide a framework for the development, evaluation and selection of graphical symbols for use in a telecommunications environment. Some difficulties have been found in evaluating symbols in accordance with the guidance given.

EG 201 472 (February 2000): Human Factors (HF); Usability evaluation for the design of telecommunication systems, services and terminals

EG 201 472 is intended to give guidance on usability evaluation methods with special emphasis on its use within the Human-Centred Design Process. The document updates the techniques described in ETR 095 and provides a readable and very useful tutorial on the subject.

EG 201 795 (July 2000): Human Factors (HF); Issues concerning user identification in future telecommunications systems

EG 201 795 is a brief document which sets out the issues in user oriented identification requirements. It provides guidelines for authors of standards to ensure that users' identification needs are met by the systems that they specify.

The document is concerned explicitly with the set-up of communications and not with their content.

EG 201 940 (April 2001): Human Factors (HF); User identification solutions in converging networks

EG 201 940 details the user requirements for a unique end user identification. A number of potential solutions are investigated which require little or no change to existing numbering schemes and identification mechanisms. The Universal Communications Identifier (UCI) is proposed as a solution.

EG 202 048 (August 2002): Human Factors (HF); Guidelines on the multimodality of icons, symbols and pictograms

EG 202 048 is a somewhat academic study of the design and use of multimodal symbols with special emphasis on the requirements of people with disabilities and elderly people. It provides guidelines to good practice and describes how their use can facilitate the Design for All approach.

The subject is treated in some detail and an extensive bibliography is provided.

EG 202 067 (September 2002): Universal Communications Identifier (UCI); System framework

EG 202 067 is a major report providing an introduction to the framework of UCI and that defines the system architecture and operations needed to implement UCI, capitalizing on existing and emerging standards which are identified in the document.

The main UCI functional entities, the required capabilities and technical requirements are described. Further descriptions cover details of communications using UCI and how it assists in privacy protection, the data handled and the security framework. An introduction is given to administration issues and the standards that could support UCI.

EG 202 072 (September 2002): Universal Communications Identifier (UCI); Placing UCI in context; Review and analysis of existing identification schemes

EG 202 072 contributes to the third phase of the UCI project and provides a detailed overview of existing naming, numbering and addressing schemes. It also reports on the application programming interface work ongoing in ETSI

EG 202 116 (March 2009): Human Factors (HF); Guidelines for ICT products and services; "Design for All"

EG 202 116 is a revised and updated version of ETR 116 which takes on board the concept of Design for All. It provides a one-stop shop for advice on the Human Factors aspects of ICT devices and is aimed at the practical designer rather than the Human Factors expert.

EG 202 132 (August 2004): Human Factors (HF); User interfaces; Guidelines for generic user interface elements for mobile terminals and services

EG 202 132 reports on the consensus building within the mobile telephone industry to achieve generic user interfaces without restricting the ability of market players to further improve and develop their terminals and services. It aims to provide simplified access to basic and selected advanced functions of mobile communications. It provides detailed advice on the harmonization of many aspects of terminals and services.

EG 202 191 (August 2003): Human Factors (HF); Multimodal interaction, communication and navigation guidelines

EG 202 191 deals with multimodal interaction, communication and navigation at the user interface showing how to reduce the exclusion of people with disabilities by using multimodality to compensate for impairments. The document sets out a number of design principles for multimodal systems. It also reports the results of a number of consultations with key researchers in the area.

EG 202 249 (March 2004): Universal Communications Identifier (UCI); Guidelines on the usability of UCI based systems

This is a lengthy document (101 pages) which gives detailed usability guidelines for the development and implementation of UCI systems. It also identifies those areas where further research is necessary or where technical details are not yet resolved.

EG 202 301 (May 2004): Universal Communications Identifier (UCI); Using UCI to enhance communications for disabled, young and elderly people

This document gives guidance on how the UCI additional information field and Personal User Agents can be used to enhance the communications experience of young and elderly people and people with disabilities.

It provides a number of recommendations which, if followed, would greatly enhance communications for the target groups.

EG 202 320 (October 2005): Human Factors (HF); Duplex Universal Speech and Text (DUST) communications

This document sets out the requirements for those users who need or prefer to communicate by text. It provides stage 1 and stage 2 descriptions of a service that could satisfy those needs and provides scenarios of practical solutions. Standards capable of providing these solutions are identified as are a number of outstanding issues that need to be addressed.

EG 202 325 (October 2005): Human Factors (HF); User Profile Management

This document provides guidelines on the management by users of their profiles which allow them to set their personal preferences for terminals and services. The document particularly aims to reduce the number of times that users have to enter the same profile information.

It provides a very large number of scenarios and much detailed guidance. The over 200 guidelines given reflect the large amount of work that went into preparing this guide.

EG 202 416 (December 2006): Human Factors (HF); User Interfaces; Setup procedure design guidelines for mobile terminals and services

The growing complexity of modern mobile terminals often provides barriers to new users who need guidance on the access and use of these terminals. This document sets out extensive user interface guidelines for set up procedures for terminals and services. The guide provides a design for all approach taking into account the needs of children and the elderly as well as disabled users.

The extensive guidelines are illustrated through a number of scenarios and use cases.

EG 202 417 (December 2006): Human Factors (HF); User education guidelines for mobile terminals and services

This document provides guidance for the creation of user guides and help systems for mobile terminals and services. It provides both generic and specific guidelines that are intended to help to increase the uptake and usage of mobile terminals and services.

Examples are given showing how to provide instructions and advice appropriate to the expertise of the user. Taid the clarity, a summary of the over 150 guidelines is provided in an annex.

EG 202 421 (January 2007): Human Factors (HF); Multicultural and language aspects of multimedia communications

This document is effectively a textbook that provides a significant tutorial on cultural and language aspects arising from wide research on the subject. It concentrates more on language than culture. The users needs are expected to be handled by use of the Universal Communications Identifier (UCI) and by the use of User Profiles. Scenarios and guidelines illustrate how user difficulties may be handled in the future.

One annex summarizes 17 main requirements and a second gives recommendations on good practice.

EG 202 423 (August 2005): Human Factors (HF); Guidelines for the design and deployment of ICT products and services used by children

This document is intended to provide guidelines for standards developers and ICT designers on how to take account of the needs of children of 12 years and younger in the design and deployment of ICT products and services. It is a useful tutorial on those aspects of design that need to be taken into account when considering the needs of child users. Annexes discuss the rationale for the document, describe the characteristics of children using ICT products, and provide advice on usability testing with children.

EG 202 487 (February 2008): Human Factors (HF); User experience guidelines; Telecare services (eHealth)

This Guide builds on TR 102 415 and provides a comprehensive list of guidelines intended to optimize the user experience of health and social care delivered within or outside their homes with the support of systems enabled by ICT. Due mainly to the large range of aspects considered (e.g. privacy, ethics, legal aspects, reliability, integrity, etc.), the advice given is somewhat difficult to access as it addresses research, development and deployment aspects.

The document is aimed at those who design, develop, procure and deploy telecare services.

EG 202 534 (November 2006): Human Factors (HF); Guidelines for real-time person-to-person communication services

EG 202 534 is a somewhat academic document that provides guidelines for communication in a number of modes such as text, audio and video and covers face to face communication, remote inspection and multipoint communication. The needs of user groups such as blind or hearing impaired users are treated.

EG 202 670 (March 2010): Human Factors (HF); User Experience Guidelines for real-time communication services expressed in Quality of Service terms

An updated version of EG 202 534 that has been extended to cover real-time person to machine communication as well as person to person communication. It takes a somewhat academic approach to its subject.

A large number of topics are addressed in a form that is sometimes a little difficult to follow. The document is supported by a searchable web based tutorial that can be found at http://portal.etsi.org/stfs/STF_HomePages/STF354/ that makes the information more readily approachable.

EG 202 745 (September 2008): Human Factors (HF); Guidelines on the provision of ICT services to young children

Provides brief guidelines for service and content providers who are deploying and provisioning ICT services being used by children under 12 years of age.

EG 203 072 (November 2003): Universal Communications Identifier (UCI); Results of a detailed study into the technical areas for identification harmonization; Recommendations on the UCI for NGN

This Guide sets out in some technical detail the requirements for users, terminals and networks whereby UCI can be implemented in an NGN environment.

ES 201 125 (February 1998): Human Factors (HF); Universal Personal Telecommunications (UPT); Specification of the minimum Man-Machine Interface (MMI) for Phase 1 UPT

ES 201 125 defines the minimum Man-Machine Interface for the phase 1 UPT service, describing the requirements to be met by the service provider, the network operator and the terminal device.

The minimum transitions are illustrated with state transition diagrams and the UPT control procedures are profusely described in Specification and Description Language (SDL) in a set of diagrams.

ES 201 275 (August 1998): Human Factors (HF); User control procedures in basic call, point-to-point connections, for Integrated Services Digital Network (ISDN) videotelephony

ES 201 275 specifies the minimum set of user procedure necessary to control a basic call point to point connection for the ISDN videotelephony service. It covers fallback to ordinary ISDN and PSTN telephony. It describes the various videotelephony services available and the different communication modes.

User control procedures and the call handling processes are described in a set of SDL diagrams. Compliance requirements and procedures are described.

ES 201 381 (December 1998): Human Factors (HF); Telecommunications keypads and keyboards; Tactile identifiers

ES 201 381 specifies the form, dimensions and location of tactile identifiers on digit "5" of keypads and on the "F" and "J" keys of keyboards.

ES 201 382 (December 2003): Human Factors (HF); Procedure for registering a supplementary service code

ES 201 382 describes the procedure to be followed when applying for a supplementary service code for use in a public network that is to be registered in the ETSI register of supplementary service codes.

ES 201 930 (May 2001): Human Factors (HF); Specification of user requirements for use in ETSI deliverables

This document lays down a requirement that all ETSI deliverables should contain an annex setting out the users of the product or service described, their goals, the equipment used, the tasks and feedback for users and the circumstances in which the product or service is intended to be used. The annex should also state how the answers have been validated.

ES 202 076 (August 2009): Human Factors (HF); User Interfaces; Generic spoken command vocabulary for ICT devices and services

ES 202 076 specifies a set of spoken commands in five European languages that can be used to control the functions of ICT devices equipped with speech recognition. All languages for the commands were user tested in their respective countries.

The commands are applicable to the functions of navigation, information retrieval, basic call handling and the configuration of preferences and they address the most common telecommunications services.

ES 202 130 (September 2007): Human Factors (HF); User Interfaces; Character repertoires, ordering rules and assignments to the 12-key telephone keypad

ES 202 130 specifies the assignment of characters to the keys in a 12 button keypad to enable such a keypad to be used for writing an SMS message or entering information into a database. It also deals with the ordering of characters.

This latest version of the document is a tour de force of nearly 300 pages that covers Latin Greek and Cyrillic script and is applicable to the official languages of the EU, those used in EFTA and Russian selected non-European languages used by significant minorities. It now extends to 98 languages in all, with an appendix dealing with three Indian languages.

This standard provides a major contribution to the work of handling cultural diversity in Europe.

ES 202 432 (November 2006): Human Factors (HF); Access symbols for use with video content and ICT devices

ES 202 432 is a simple document which defines the symbols to be used to identify the availability of subtitling, audio description, signing, speech output and spoken command on a range of ICT devices and services. The work of development and evaluation of these symbols is described in TR 102 520.

ES 202 746 (February 2010): Human Factors (HF); Personalization and User Profile Management; User Profile Preferences and Information

This standard specifies a set of user profile preference and information settings for use in ICT services and devices including a rule definition for functionality and objects including settings, values and operations.

The document provides detailed instructions, setting out how such information is to be handled, so as to permit a profile to be migrated between User Profile Management systems.

ES 202 975 (October 2009): Human Factors (HF); Harmonized relay services

A standard based mainly on TR 101 806 that sets out the requirements for various types of relay services that enable communication between hearing impaired and other users. It deals with text relay, speech to speech relay, signing and lip reading services as well as text to text and facsimile relay. It is intended to be used mainly by procurers commissioning such services.

SR 001 996 (March 2010): Human Factors (HF); An annotated bibliography of documents dealing with Human Factors and disability

This is the present document which gives a listing of ETSI, ISO/IEC and ITU-T documents dealing with Human Factors and disability together with some comment on their content.

TR 101 041-1 (May 1997): Human Factors (HF); European harmonization of network generated tones; Part 1: A review and recommendations

TR 101 041-1 reports the results of a project to study and investigate the potential for the harmonization of information tones generated by public networks. It reviews the range of tones currently in use within Europe and world-wide. Suggestions are made for possible implementation strategies for the harmonization of tones and the difficulties of doing so are identified. Little progress appears to have been made to use regulation to encourage the process of harmonization.

TR 101 041-2 (May 1997): Human Factors (HF); European harmonization of network generated tones; Part 2: Listing and analysis of European, World and Standardized tones

TR 101 041-2 provides the most up to date listing of tones in use throughout the world and is a useful reference document for terminal designers working in the field of automatic tone detection.

TR 101 056 (June 1997): Human Factors (HF); Human Factors aspects of the European Telephony Numbering Space (ETNS)

TR 101 056 deals with the human factors aspects of a European telephone number and was later developed into a standard (EN 301 104) in accordance with the European Numbering Task force work programme. It treats number length issues, portability issues, the identification of services and charging, routing options linguistic problems and usability testing.

TR 101 767 (January 2000): Human Factors (HF); Symbols to identify telecommunications facilities for deaf and hard of hearing people; Development and evaluation

TR 101 767 describes the background research on symbols development and evaluation of symbols to identify telecommunications facilities for deaf and hard of hearing people that led to EN 301 462. The quality of the evaluation was somewhat undermined by the difficulty of obtaining sufficient test results using voluntary effort. Some difficulty was also found in reconciling the test results with requirements of international standards bodies.

TR 101 806 (June 2000): Human Factors (HF); Guidelines for Telecommunications relay services for text telephones

TR 101 806 provides guidelines for the provision of relay services, especially those which enable a text telephone user to converse with a telephone user or with another text telephone user. It also deals with spoken to spoken relays and relays using videotelephones.

TR 102 015 (November 2001): Human Factors (HF); Supplementary Services; A review of ETSI deliverables

A slight document intended solely for internal HF use that reviewed HF documents dealing with Supplementary Services and recommended change to one of them and to the ETSI Web site.

TR 102 068 (November 2002): Human Factors (HF); Requirements for assistive technology devices in ICT

TR 102 068 reviews the requirements of those users in need of assistive technology and classifies the signal information exchanged between assistive devices and ICT equipment. Interface technologies are reviewed and recommendations made for protocols and interfaces appropriate to differing types of information.

Proposals are made for an AT command to identify specific commands from assistive devices.

TR 102 083 (January 1999): Human Factors (HF); Supplementary service codes for use in public network services

TR 102 083 describes the use of those supplementary service codes that were identified in the answers to a questionnaire sent out to the ETSI membership. The document provides categorized listing of supplementary services and gives a set of network independent definitions.

It also describes the creation of an ETSI register of codes. The application and registration procedures are described in ES 201 382.

TR 102 125 (October 2002): Human Factors (HF); Potential harmonized UI elements for mobile terminals and services

TR 102 125 identifies common basic tasks and goals of users of mobile terminals, analyses them, and examines the possibilities and difficulties of harmonization of the user interface.

It recommends the drawing up of a guide aimed at simplification of end user access to mobile information communication devices and services.

TR 102 133 (April 2003): Human Factors (HF); Access to ICT by young people: issues and guidelines

TR 102 133 reviews the human interaction issues for access by children to ICT. The development of children is described together with their use of ICT. Relevant ethical and legal issues are discussed. Conclusions are drawn and recommendations made on the treatment of the identified issues.

A number of initiatives and projects in the field are described and a useful bibliography is provided.

TR 102 202 (May 2003): Human Factors (HF); Human Factors of work in call centres

TR 102 202 deals with the human factors aspects of work in call centres and gives some recommendations of best practice. It is based on reviews of existing studies of call centre operation in the UK and other countries, supported by some practical research. The document identifies jobs and tasks in call centres and the attributes and skills of call handlers and related training issues. The practical issues of disability are considered.

It is aimed at managers of call centres, their customers, call centre equipment and software designers and manufacturers, occupational health and human resources management. The focus is on call handlers, but the advice is also pertinent to employees with other roles in call centres.

TR 102 274 (January 2004): Human Factors (HF); Guidelines for real time person to person communication services

This report presents fitness for purpose human factors guidelines for real time person to person services developed from the eye-to-eye project. The work addresses mainly business communications services and provides initial guidelines and recommendations for their future development.

TR 102 279 (January 2004): Human Factors (HF); Two surveys on assistive technology

This is a minor document giving details of the results of two surveys on the requirements of assistive technology devices in ICT systems. The information is provided solely to make the information available for use by other researchers in the field of disability.

TR 102 415 (August 2005): Human Factors (HF); Telecare services; Issues and recommendations for user aspects

This report provides an initial study into the delivery of health and social care to individuals within the home or their wider community with the support of ICT enabled systems. It identifies key stakeholders that are active in the provision of telecare services and discusses aspects such as service provision elements, stakeholders' concerns and ethical, privacy and security issues. It is basically a document that sets the scene for telecare, discussing the presently available and possible future means its provision.

TR 102 520 (November 2006): Human Factors (HF); Access symbols for use with video content and ICT devices; Development and evaluation

This document describes the background research, symbols development and the evaluation testing that went into creating the standard ES 202 432 which specifies the symbols to be used to identify the availability of subtitling, audio description, signing, speech output and spoken command on a range of ICT devices and services.

TR 102 535 (July 2007): Human Factors (HF); Guidelines for real-time person-to-person communication services; Future requirements

This document reports the background research to EG 202 534 and describes the requirements for guidelines and the associated tutorial system.

It considers future work on enhancement of both the guide and the tutorial system and looks ahead to new service areas.

TR 102 548 (November 2008): Human Factors (HF); User experience; 3G and Mobile Broadband Interoperability Plugtest: Approach, scenarios and test specification; Outcomes, conclusions and recommendations

This report describes the approach, scenarios, test specifications and other useful information necessary for the 3G and Mobile broadband interoperability Plugtest event held in August 2008. It also provides a summary of the event's results and makes some recommendations for future events.

TR 102 612 (March 2009): Human Factors (HF): European accessibility requirements for public procurement of products and services in the ICT domain (European Commission Mandate M/376, Phase 1)

Written in response to an EU Mandate, this document is a 200+ page report on the accessibility requirements currently used for procurement in Europe and the Americas. It further makes a detailed analysis of relevant available standards, requirements and legislation from around the world.

The document provides a mass of information suitable for use to create an EN intended to form the basis of future procurement requirements for ICT products and services and makes recommendations on how future progress in this area could be achieved.

TR 102 643 (January 2010): Human Factors (HF): Quality of Experience (QoE) requirements for real-time communication services

This report sets a detailed explanation of the concept of Quality of Experience (QoE) and introduces the Web-based Guideline and Tutorial System which uses the guidelines set out in EG 202 670 and which is intended to improve the dissemination and use of QoE data.

TR 102 762 (January 2010): Human Factors (HF): Intelligent Transport Systems (ITS); ICT in cars

This report identifies the key aspects of the use of ICT in cars and provides advice on its safer and more effective use. It deals with built in equipment, in-vehicle networks and the use of portable equipment in the vehicle. It deals with both Intelligent transport systems as related to the driver and with pure entertainment systems.

It provides valuable advice to designers of in car ICT equipment and to suppliers of services and devices to be used in such vehicles.

TR 102 783 (March 2010): Human Factors (HF): Web-based Guideline and tutorial system for Real-time Communication Services; QoE (Quality of Experience) expressed in QoS (Quality of Service) terms; Supporting and maintenance information

This document sets out an overview of the Web-based Guideline and Tutorial System which uses the guidelines set out in EG 202 670 and gives a rationale for many aspects of its design.

TR 102 972 (October 2009): Human Factors (HF): User Interfaces; Generic user interface elements for 3G/UMTS mobile devices, services and applications

This report extends beyond EG 202 132 and TR 102 125 to provide a comprehensive list of guidelines intended to optimize the user experience of 3G/UMTS mobile devices, services and applications. It deals with a large range of aspects (e.g. networks and devices, services and applications etc) and uniquely covers accessibility applications enabled through 3G systems.

The document in no way conflicts with 3GPP specifications (which take precedence) and is aimed at those who design, develop and provide mobile networks and services.

TR 102 974 (September 2009): Human Factors (HF): Telecommunications relay services

This is a purely informative document that sets out the background to the writing of ES 202 975 on Harmonised relay services. It also records the results of research made during the preparation of that standard.

TR 103 073 (November 2003): Universal Communications Identifier (UCI); Improving communications for disabled, young and elderly people

This document reports the results of questionnaires answered in interviews with elderly people, disabled people and young children in ICT environments. The results which are reported identified a number of communications issues relevant to the target groups.

TR 103 077 (November 2002): Universal Communications Identifier (UCI); Maximizing the usability of UCI based systems

TR 103 077 expands on earlier UCI Guides and identifies a number of user requirements which are suitable to be expanded into guidelines. Other areas requiring further work are also identified.

TS 102 511 (August 2007): Human Factors (HF); AT Commands for Assistive Mobile Device Interfaces

TS 102 511 arises from and extends the work of TR 102 068 by making an extensive investigation of the use of existing AT commands to interoperate with assistive devices to provides accessibility to mobile devices and services. It reports on extensive research into existing user needs and current solutions, identifies the gaps where the necessary commands do not exist and makes recommendations for a suggested syntax for some of the missing commands.

Although the document is nominally a TS, most of the content is informative. Even so it presents a comprehensive treatise on the subject

TS 102 577 (September 2008): Human Factors (HF); Public Internet Access points (PIAPs)

TS 102 577 gives guidance to suppliers of facilities publicly provided for general use to access the Internet. A "Design for All" approach is followed so as to ensure that PIAPs are more readily accessible to all people including elderly users and those with disabilities.

It provides a large amount of information on the background and use of PIAPs, gives a number of recommendations that address their accessibility and makes proposals for new standards in the area.

TS 102 747 (April 2010): Human Factors (HF); Personalisation and User Profile Management; Architectural framework

This document builds on the user profile concept described in EG 202 325 by specifying the requirements of an architectural framework to support the personalisation and user profile management concepts set out in that document.

In addition, the standard also sets out requirements for the important security and privacy issues associated with user profiles when transferred over networks.

It is intended to permit users to provide the necessary information for a range of differing products and environments without the need for repeated input of the same information.

4.2 CEN documents

CWA 14661 (February 2003): Guidelines to Standardisers of ICT products and services in the CEN ICT domain

This document is intended to clarify ICT standardization in relation to disabled and older people in the context of design-for-all. It provides a lot of information on the global and European political background of guidelines it refers out to the Tiresias website.

CWA 14835 (September 2003): Guidelines for making information accessible through sign language on the web

This brief document is aimed at Webmasters and sets out to give guidance on how to add sign language on the web. It recommends an icon to indicate sign language availability that differs from that specified in ES 202 432.

CWA 15554 (June 2006): Specifications for a Web Accessibility Conformity Assessment Scheme and a Web Accessibility Quality Mark

This document describes a scheme to provide a model for a harmonised web accessibility quality mark. It makes proposals to set up a European Authority for Web Accessibility Conformity Assessment which would control the issuing of the quality mark by inspection bodies, certification bodies or by suppliers making declarations.

CWA 15778 (February 2008): Document Processing for Accessibility

This is a significant document that discusses the opportunities for making information more readily accessible when it is published in digital form. It draws attention to the need properly to structure documents and to improve the whole processing chain in order to achieve the utmost advantages of digital publishing.

The document gives a number of scenarios and lists some actual examples of accessible publishing.

4.3 ISO/IEC documents

ISO/IEC Guide 71 (2001): Guidelines for standards developers to address the needs of older persons and persons with disabilities

This document sets out a useful checklist for standards developers of those factors that should be considered to ensure that standards take into account the needs of elderly and disabled users. Some simple recommendations are provided.

This document also exists with similar content as CEN/CENELEC Guide 6.

ISO/IEC Guide 74 (2004): Graphical symbols - Technical guidelines for the consideration of consumers' needs

This document sets out procedures for the development of signs and symbols for public information and for safety signs to be used on equipment and products. It identifies the standards that give recommendations for their development and evaluation.

ISO 9186: Graphical symbols - Test methods for judged comprehensibility and for comprehension

This standard describes the procedures for selecting a graphical symbol and describes the procedures for comprehensibility judgement testing and comprehension testing. It also defines the circumstances that control when comprehension testing should be carried out.

ISO 9241: Ergonomic requirements for office work with visual display terminals (VDT)

ISO 9241 is targeted primarily at system designers but can also be used by those responsible in organizations for the procurement of equipment. Although the title refers to requirements for office work, the application of the standard is not restricted to offices.

ISO 9241 Part 1 (1997) Amd 1 (2001): General introduction

Introduces the standard as a whole and provides an overview of the standard. It deals with text and data processing (not Computer Aided Design or process control tasks) and describes the basis of the user performance approach which details the important ergonomic factors and how to measure them.

An amendment deals particularly with the software parts of the standard and gives advice on their use.

ISO 9241 Part 2 (1992): Guidance on task requirements

Provides guidance on office task design in VDT based information processing systems relevant both to users and to designers of such systems.

The objectives of task design and the characteristics of well designed tasks are described and guidance is provided on how task requirements can be identified and specified.

ISO 9241 Part 3 (1992) Amd 1 (2000): Visual display requirements

Deals with the characteristics of a visual display which determine its effectiveness in presenting an image to the user. It specifies image quality requirements for the design and evaluation of VDTs. A user performance assessment method is provided in an annex which is replaced in amendment 1. Although it deals specifically with displays used in offices, it is appropriate to specify it for most applications which require general purpose displays to be used in an office-like environment.

ISO 9241 Part 4 (1998) Cor1 (2000): Keyboard requirements

Specifies the ergonomics design characteristics of an alphanumeric keyboard which may be used comfortably, safely and efficiently to perform office tasks. It also specifies methods of conformance testing.

ISO 9241 Part 5 (1998): Workstation layout and postural requirements

Specifies the ergonomics requirements for a Visual Display Terminal workplace which will allow the user to adopt a comfortable and efficient posture.

ISO 9241 Part 6 (1999): Guidance on the work environment

Specifies the ergonomics requirements for the Visual Display Terminal working environment which will provide the user with comfortable, safe and productive working conditions. It takes into account lighting, the effects of noise and vibration, electrical and magnetic fields, static electricity, the thermal environment, space organization and the workplace layout.

ISO 9241 Part 7 (1998): Requirements for display with reflections

Makes recommendations for image quality with the aim of making VDTs legible and comfortable in use. It specifies methods of measurement of glare and reflections from the surface of display screens, including those with surface treatments.

ISO 9241 Part 8 (1997): Requirements for displayed colours (CD)

Specifies the requirements for multi-colour displays which are largely in addition to the monochrome requirements in Part 3. It is intended to be independent of display technology providing a lot of technical detail and test descriptions.

ISO 9241 Part 9 (2000): Requirements for non-keyboard input devices (CD)

Specifies the ergonomics requirements for non-keyboard input devices which may be used in conjunction with a visual display terminal. It covers such devices as the mouse, trackball and other pointing devices. It also includes performance test requirements. It does not address voice input.

ISO 9241 Part 10 (1996): Dialogue principles

Provides ergonomic principles in general terms for dialogue in visual display terminals. It deals with suitability for the task, suitability for learning, suitability for individualization, conformity with user expectations, self descriptiveness, controllability, and error tolerance by giving examples of applications.

ISO 9241 Part 11 (1998): Guidance on Usability

Defines usability and explains how to identify what it is necessary to take into account when specifying or evaluating usability in terms of measures of user performance and satisfaction. Annexes provide guidance on specifying the context of use of the product and give examples of usability measures. It includes an example of how the usability of a product can be specified and evaluated.

ISO 9241 Part 12 (1998): Presentation of information

Contains specific recommendations for presenting and representing information on text-based and graphical user interfaces used for office tasks. It includes guidance on ways of representing complex information using alphanumeric and graphical/symbolic codes, screen layout, and design as well as the use of windows.

ISO 9241 Part 13 (1998): User guidance

Provides recommendations for the design and evaluation of user guidance attributes of software user interfaces including Prompts, Feedback, Status, On-line Help and Error Management.

ISO 9241 Part 14 (1997): Menu dialogues

Provides recommendations for the design of menus used in user-computer dialogues. The recommendations relate to dialogue, input and output and cover menu structure, navigation, option selection and execution, and menu presentation. Sample techniques and a checklist are given for assessing compliance.

ISO 9241 Part 15 (1997): Command dialogues

Provides recommendations for the design of command dialogues. It covers command language structure and syntax, command representations, input and output considerations, and feedback and help. Sample techniques and a checklist are given for assessing compliance.

ISO 9241 Part 16 (1999): Direct manipulation dialogues

Provides recommendations for the design of direct manipulation dialogues where the user acts directly on objects on the screen. It covers those aspects of Graphical User Interfaces which are directly manipulated, and not covered by other parts of ISO 9241. Sample techniques and a checklist are given for assessing compliance.

ISO 9241 Part 17 (1998): Form filling dialogues

Provides recommendations for the design of form filling dialogues. The recommendations cover form structure and output considerations, input considerations, and form navigation. Sample techniques and a checklist are given for assessing compliance.

ISO/IEC 9995: Information Technology - Keyboard layouts for text and office systems**ISO/IEC 9995-1 Part 1 (1994): General principles governing keyboard layouts**

Identifies the division of keyboards into sections and zones and defines key positions in the form of a grid. The general principles governing key labelling and symbol position are described.

ISO/IEC 9995-2 Part 2 (2002): Alphanumeric section

Divides the alphanumeric section of the keyboard into zones and describes the characters to be accommodated. It does not define an allocation of specific characters to specific key positions, leaving that to national customs and standards.

ISO/IEC 9995-3 Part 3 (2002): Complementary layouts of the alphanumeric zone of the alphanumeric section

Defines a secondary set of characters which, when used in combination with a national keyboard layout, allows the input of the full graphic character repertoire defined in ISO/IEC 6937. It also defines an allocation of specific characters to specific key positions for use where national standards do not exist.

ISO/IEC 9995-4 Part 4 (2002): Numeric section

Deals with the layout of the numeric section of a keyboard. It describes both the "1-2-3" and the "7-8-9" layouts of the numbers with the telephone type "1-2-3" layout being preferred. It also allocates functions to the keys above and to the right of the numeric keys.

ISO/IEC 9995-5 Part 5 (1994): Editing section

Divides the editing section of the keyboard into zones and describes the allocation of the functions to the keys.

ISO/IEC 9995-6 Part 6 (1994): Function section

Divides the function section of the keyboard into zones and describes the allocation of the functions to the keys.

ISO/IEC 9995-7 Part 7 (2002): Symbols used to represent functions

Aims to define symbols for the functions on any type of numeric, alphanumeric or composite keyboard. The symbols described cannot be said to be in common usage. An amendment defines some more common arithmetic symbols.

ISO/IEC 9995-8 Part 8 (1994): Allocation of letters to the keys of a numeric keypad

Specifies which letters go on which keys on the numeric zone of a keyboard. The use of letters on such keys is strongly deprecated. It is fully harmonized with ETS 300 640 and with ITU-T Recommendation E.161.

ISO 639 (1998): Code for the representation of names of languages.

Although not strictly a human factors standard, ISO 639 provides a two letter coding for representing the names of languages to enable them to be called up as required in any system.

ISO/IEC 11581: User symbol interfaces and symbols - Icon symbols and functions**ISO/IEC 11581-1 (2000): Icons - general**

Contains a framework for the development and design of icons, including general requirements and recommendations applicable to all icons.

ISO/IEC 11581-2 (2000): Object icons

Contains requirements and recommendations for icons that represent functions by association with an object, and that can be moved and opened. It also contains specifications for the function and appearance of a number of icons.

ISO/IEC 11581-3 (2000): Pointer icons

Describes the user interaction with and appearance of pointer icons that are logically attached to an input device that the user manipulates to interact with other screen elements. It describes the function and appearance of a number of icons.

ISO/IEC 11581-4: Control icons

Future work.

ISO/IEC 11581-5 (2004): Tool icons

This part describes user interaction with and appearance of tools on the screen. It also specifies the relationship between tools and pointers.

ISO/IEC 11581-6 (1999): Action icons

Describes the user interaction with and appearance of action icons that represent actions and which act upon a selected source and/or target, providing single step access to functions typically available by a menu. It describes the function and appearance of a number of icons.

ISO 13407 (1999): Human centred design processes for interactive systems

Describes the principles of human centred design of computer based interactive systems. It provides a useful tutorial on the process of Human centred design. An annex lists a number of other relevant standards giving comment on the contents in a similar manner to this document.

Further annexes give examples of a structure of a usability evaluation report and of a sample procedure for demonstrating conformance.

ISO/IEC 13714 (1995): Information Technology - Document processing and related communications - User interface to telephone based services: Voice messaging applications

Deals with the features of the DTMF controlled stored voice service of voice messaging. It defines a new record tone (a chime) to identify standard systems and allocates usage for some of the keys to specific functions.

It is becoming the base standard for most stored voice services and is now being specified by in the UK by British Telecom.

ISO 16071 (2003): Ergonomics of human-system interaction - Guidance on accessibility for human-computer interfaces

Provides guidance on the design of accessible software. It covers users with the widest possible range of visual, hearing, motor and cognitive abilities including the elderly and those who are temporarily disabled.

The document also gives advice on the provision for assistive technologies.

IEC 80416-1 (2001): Basic principles for graphical symbols use on equipment - Part 1: Creation of symbol originals

This document, which replaces ISO 3461-1 and IEC 60416 (1988) describes principles and guidelines for the creation of graphical symbol originals for use on equipment.

It provides the base pattern into which all symbols are required to be fitted and describes the procedures necessary for adoption of the symbol by the ISO/IEC.

ISO 80416-4 (2005): Basic principles for graphical symbols use on equipment - Part 4: Guidelines for the adaption of graphical symbols for use on screens and displays (icons)

This document provides guidelines on how to adapt graphical symbols to allow them to be presented as on-screen icons.

It provides a number of useful examples of the process.

4.4 ITU-T documents

4.4.1 E series Recommendations

E.120 (November 1988): Instructions for users of the international - telephone services

Sets out guidelines for the structure and content of telephone directories and proposes the provision of pocket guides to travellers.

E.121 (June 04): Pictograms, symbols and icons to assist users of the telephone service

Gives examples of a number of graphical symbols which can be used in various environments to give instructions, to identify function keys or to convey information to users with the minimum of reliance on language. It also describes graphical means of describing tones.

It is of value to authors of handbooks and to terminal designers and it would be well if some of these standard symbols were more widely used.

E.122 (November 1988): Measures to reduce customer difficulties in the international telephone service

Suggests use of recorded announcements and instructions on the use of the trunk prefix.

E.123 (February 2001) Notation for national and international telephone numbers, e-mail addresses and Web addresses

Provides a recommended layout for presenting international numbers on letterheads and business cards, etc.

E.124 (November 1988): Discouragement of frivolous international calling to unassigned or vacant numbers answered by recorded announcements without charge

Gives advice to administrations on dealing with outbreaks of frivolous calling to foreign announcements.

E.125 (October 1984): Inquiries among users of the international telephone services

Merely a reference out to questionnaires in Volume II of the Red Book which may be used to ascertain users opinions on services.

E.126 (November 1988): Harmonization of the general information pages of the telephone directories

Suggests a common presentation and content of the general information pages in a directory so as to assist foreign users.

E.127 (November 1988): Pages in the telephone directories intended for foreign visitors

Gives recommendations on the content of directory pages specifically intended for foreign visitors.

E.128 (November 1988): Leaflet to be distributed to foreign visitors

Gives guidelines on the structure and content of leaflets intended for distribution to foreign visitors.

E.130 (November 1988): Choice of the most useful and desirable supplementary telephone services

A trivial introduction on factors to decide which supplementary services should be offered.

E.131 (November 1988): Subscriber control procedures for supplementary telephone services

Describes AT&T, CEPT and NTT code schemes for some supplementary services but without giving any real recommendations. Contains a useful glossary.

E.132 (November 1988): Standardization of elements of control procedures for supplementary telephone services

Gives recommendations on some actual code elements for use in supplementary services.

E.133 (November 1988): Operating procedures for cardphones

Recommends a sequence of procedures for use in cardphones.

E.134 (March 1993): Human factors aspects of public terminals: generic operating procedures

A brief document setting out a basic sequence of user actions for operating a public terminal. It defines when payment should occur and recommends a "next" call facility.

E.135 (October 1995): Human factors aspects of public telecommunications terminals for people with disabilities

Provides advice for the design of public terminals to assist disabled users to carry out the steps described in E.134.

E.136 (May 1997): Specification for tactile identifier for use with telecommunication cards

A document recommending the tactile identifier specified in ETS 300 767.

E.137 (05/97): User instructions for payphones

Gives advice for the design of user instructions intended to be placed on or near payphones. It is based on and extends the advice given in ETR 167.

E.138 (June 2002)+Erratum (February 2003): Human factors aspects of public telephones to improve their usability for older people

Describes characteristics of older people and their likely handicaps and gives a number of recommendations covering all aspects of the Man/Machine interface.

E.161 (February 2001): Arrangement of figures, letters and symbols on telephones and other devices that can be used for gaining access to a telephone network

Recommended arrangement of letters to be used for alphanumeric dials and keypads. Also specifies the tactile identifier for the "5" button, identical to that in ES 201 381.

E.180 (March 1998) Technical characteristics of tones for the telephone service

Gives electrical levels for tones and describes characteristic required for a number of tones. It is aimed mainly at administrations and some of its detail is getting a little out of date.

E.181 (November 1988): Customer recognition of foreign tones

A trivial note on giving advice to customers how to tell the difference between dial tone and engaged tone. It does acknowledge that tones today can often be locally generated.

E.182 (March 1998) Application of tones and recorded announcements in telephone services

A useful discussion on its subject with an annex giving a list of tones and announcements with their definitions.

E.183 (March 1998) Guiding principles for telephone announcements

An introduction to the use of recorded announcements and synthetic speech giving advice on some general principles.

E.184 (November 1988): Indications to users of ISDN terminals

A brief statement that the ISDN can give alternatives to tones for giving information to customers.

E.330 (November 1988): User control of ISDN supported services

A few broad statements about ISDN supported services giving little of value.

E.331 (October 1991): Minimum user terminal interface for a human user entering address information into an ISDN terminal

Sets out new numbering plan possibilities in the ISDN and advises structures permitting users to cope with them on a terminal with a 12 digit keypad.

4.4.2 F series Recommendations

F.790 (January 2007): Telecommunications accessibility guidelines for older persons and persons with disabilities

This Recommendation provides broad guidance to ensure the accessibility of telecommunications equipment and services for people with the widest range of abilities including older persons and those with disabilities.

It gives general advice on the design process and list a number of common requirements for the operation and usage of equipment and services. It makes reference to ETSI documents written by TC HF.

F.901 (March 1993): Usability evaluation of telecommunication services

F.901 gives fairly vague advice on the testing of usability and gives a brief example of a usability evaluation of an ISDN videotelephone.

F.902 (February 1995): Interactive services design guidelines

This Recommendation provides broad guidance in general terms for the design of the basic features of interactive services using DTMF input and voice response.

F.910 (February 1995): Procedures for designing, evaluating and selecting symbols, pictograms and icons.

Recommends a methodology for the selection and evaluation of symbols etc. and gives reasonably detailed descriptions of suitable experimental procedures for evaluation studies.

4.4.3 P series Recommendations

P.10 (July 2006): Vocabulary and effects of transmission parameters on customer opinion of transmission quality: Vocabulary for performance and quality of service

This document is also numbered G.100. It contains a listing of terms and definitions particular to Study Group 12.

P.11 (March 1993): Effect of transmission impairments

P.11 provides a brief tutorial on the effect of various impairments on the customer opinion of transmission quality.

P.16 (November 1988): Subjective effects of direct crosstalk; thresholds of audibility and intelligibility

This document provides a brief tutorial on the effect of crosstalk, its audibility and intelligibility.

P.76 (November 1988): Determination of Loudness Ratings; Fundamental principles

P.76 describes the principles of a measurement intended to represent the effects of human speech and hearing over a standard air path. Only of value for background information.

P.78 (February 1996): Subjective testing method for determination of loudness ratings in accordance with recommendation P.76

This document gives details of a subjective testing method that can be used to derive the loudness ratings described in P.76. Tests too complex for normal use. Only of value for background information.

P.79 (November 2007): Measurements related to speech loudness; Calculation of loudness ratings for telephone sets

P.79 gives details of an algorithm for calculating loudness ratings which takes into account the various effects present in human speaking and hearing. These algorithms provide the basis for modern objective testing.

P.85 (June 1994): A method for the subjective performance assessment of the quality of speech voice output devices

This Recommendation provides a method for the evaluation of the speech output of stored voice systems. Experimental design is treated and recommendations are given for the analysis and reporting of the results.

P.311 (May 2005): Transmission characteristics of wideband (150-7000 Hz) digital handset telephones

P.311 gives a similar range of transmission performance requirements to Recommendation P.31 but for handset telephones capable of transmitting on bandwidths typically from 150 to 7 000 Hz. An annex describes objective test methods.

P.341 (May 2005): Transmission characteristics of wideband (150-7000 Hz) digital handsfree terminals

This document gives recommendations on the transmission performance of handsfree telephones and has an annex that deals with measurement methods.

P.370 (August 1996): Coupling hearing aids to telephone sets

P.370 gives figures for the sensitivity and frequency characteristics of coupling coils intended to couple to hearing aids equipped with induction pick-up coils. An annex describes measurement methods.

The provision of additional receive amplification and electrical coupling are also dealt with.

P.800 (August 1996): Methods for subjective determination of transmission quality

P.800 gives advice on conducting a number of different subjective tests on general aspects of speech quality. Tests too complex for normal use. Only of value for background information.

P.830 (February 1996): Subjective performance assessment of telephone-band and wideband digital codecs

This document defines a specific testing method for evaluating digital processes in a manner such that quantization distortion effects can be taken into account. Tests too complex for normal use. Only of value for background information.

P.840 (November 2003): Subjective listening test method for evaluating circuit multiplication equipment

This Recommendation describes a subjective listening test method for evaluating digital circuit multiplication and packetized voice systems which use digital speech interpolation techniques. Far too complex for normal use. Only of value for background information.

P.910 (April 2008): Subjective video quality assessment methods for multimedia applications

P.910 describes subjective assessment methods for evaluating the one-way overall video quality for multimedia applications such as videoconferencing, storage and retrieval applications, tele-medical applications, etc.

P.911 (December 1998)+Corr (September 1999): Subjective audiovisual quality assessment methods for multimedia applications

This document describes subjective assessment methods for evaluating the on-way overall audiovisual quality for multimedia applications such as videoconferencing, storage and retrieval applications, tele-medical applications, etc.

P.930 (August 1996): Principles of a reference impairment system for video

This Recommendation describes an adjustable video reference system that can be used to generate the reference systems necessary to characterize the subjective picture quality of video produced by compressed digital video systems. Various picture degradations are described.

P.931 (December 1998): Multimedia communications delay, synchronization and frame rate measurement

Multimedia communications systems have the ability to maintain a temporal relationship between the different media. This Recommendation specifies the parameters and measurement methods used to assess the relative synchronisation between the media channels.

P.1010 (July 2004): Fundamental voice transmission objectives for VoIP terminals and gateways

This document sets requirements for 3.1 kHz handset telephony performance of packet based terminals and gateways. It addresses the whole range of IP-based gateways and terminals including wireless and softphones

4.4.4 Z series Recommendations

Z.301 (November 1988): Introduction to the CCITT Man-Machine Language (MML)

This Recommendation describes the basis of the CCITT man-machine language. The language provides a consistent interface, is flexible adaptable and structured. It has an open ended structure so that the addition of new functions have no influence on existing ones so as to allow the introduction of new technology.

Z.323 (November 1988): Man-machine interaction

This document describes how interactions should take place between the user and the system from a logical viewpoint. It is aimed at presentations of the man machine interface using visual display terminals and provides guidelines for the display.

It also gives guidelines for user guidance, design of menus and forms and provides examples of dialogue procedure.

Z.351 (March 1993): Data oriented human-machine interface specification technique - Introduction

This document provides an introduction and glossary to the data oriented Human Machine Interface (HMI) specification technique which is intended to facilitate the specification of human to machine interfaces.

Z.352 (March 1993): Data oriented human-machine interface specification technique - Scope, approach and reference model

The scope of Z.352 is to specify the data seen at the human to machine interface of equipment and to specify the grammar for the data. The data oriented approach identifies the data passing across the interface rather than the functions to be performed.

The data oriented approach permits the partitioning of HMI specifications and software into layered specifications. The Recommendation is aimed at system management. An annex provides guidelines for HMI developers.

History

Document history		
V1.1.1	September 2001	Publication
V2.1.1	October 2003	Publication
V3.1.1	December 2005	Publication
V4.1.1	August 2007	Publication
V5.1.3	November 2010	Publication