



EENA Operations Document

112 Accessibility for People with Disabilities

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1 Introduction

Disability affects 15-20% of every country's population: there are at least 650 million people with disabilities worldwide, while disabled people represent 80 million persons in the European Union. One in four Europeans has a family member with a disability. Disabled people suffer from isolation. Compared to non disabled people, by more than twice, disabled people meet their friends and relatives less than one or two times per month.¹ Isolation and limited options for communication leave those of us with special needs due to a disability, even more vulnerable in emergencies.

97% of Europeans think that something should be done to ensure better integration of people with disabilities into society.² All people encountering obstacles in their daily life with a disability simply wish to be heard when calling for help just like their less challenged counterparts.

According to the European Commission, the European emergency number 112, which is used to contact emergency services free of charge all over the EU, is currently not accessible to the majority of disabled people. Only 7 countries were reported to have implemented an accessible 112 for people with disabilities.³ In 2009, the amended Universal Service Directive invited the Member States to ensure an equivalent access to 112 for all citizens. European countries are now looking into efficient and reliable solutions to comply with EU legislation and improve inclusion of citizens with disabilities.

Attitudes to people with disabilities are changing significantly. From seeing people with disabilities as the passive recipients of charity, society has come to recognise the legitimate demands of disabled people for equal rights, and access to services and opportunities, now facing the challenges in implementing accessibility and removing existing barriers, and improving the availability and choice of assistive technologies.

The objective of this Operations document is to describe main issues related to the accessibility of 112 services for people with disabilities, assemble relevant, currently available information about this issue, outline some of the 'best practices' from system-focused as well as user-focused perspective and inspire further action eradicating barriers in access to crucial, potentially life saving 112 services.

2 Abbreviations, Glossary and Definitions

2.1 Abbreviations

ICF - International Classification of Functioning

ICIDH-2 International Classification of Functioning, Disability and Health

WHO – World Health Organisation

MS – Member states

MMS – Multimedia Messaging Service

PSAP - Public Safety Answering Point

EU – European Union

EC - European commission

UN - United Nations

ICT – Information and communication technologies

TTY – US term for Textphone

TRS – Text Relay service

VRS – Sign Relay service

1 Source: http://www.edf-feph.org/Page_Generale.asp?DocID=12534

2 Source: http://www.edf-feph.org/Page_Generale.asp?DocID=12534

3 Source: http://www.reach112.eu/preview/en/registration/issue_1.html



2.2 Glossary

Sign Languages: Visual/gestural, non-written languages with their own unique syntax and grammars based on hand shapes, body movements and facial expressions.

Deaf: Partially or completely lacking in the sense of hearing.

Deaf-Blind: A term used to describe a person in whom hearing loss and vision impairment combine to interfere with his/her ability to hear and see. S/he may have either total or partial loss of both senses.

Hard of Hearing: The term —hard of hearing refers to those who have some hearing, are able to use it for communication purposes, and who reasonably comfortable doing so. A hard of hearing person, in audiological terms, may have a mild to moderate hearing loss.

Next Generation 112 (NG112) - NG112 is defined by two major aspects:

- Interoperability between emergency services: NG112 enables the several Public Safety Answering Points to be part of a common emergency service IP-network, providing them with redundancy and interoperability features. This network should support data and communications needs for coordinated incident management between PSAPs and provide a reliable and secure environment for emergency communications.

- Communication between citizens and emergency services: NG112 is designed to enable citizens to reach an authority (e.g., PSAP) by calls using VoIP, text messaging, instant messaging, real-time text, pictures and videos. It could also provide emergency services with more data such as telematics and health data. NG112 enables the delivery of calls, messages and data to the appropriate Public Safety Answering Point (PSAP) and other appropriate emergency entities and makes call handling easier.

2.3 Definitions

The World Health Organisation (WHO) Classification of Impairment, Disability and Handicap (ICIDH), published by the WHO in 1980 distinguishes: impairment, disability and handicap):

Impairment: Any loss or abnormality of psychological, physiological or anatomical structure or functions.

Disability: Any restriction or lack (resulting from an impairment) of ability to perform an activity in the manner of or within the range considered normal for a human being.

Handicap: A disadvantage, for a given individual, resulting from an impairment or a disability, that limits or prevents the fulfilment of a role that is normal (depending on age, gender, social and cultural factors) for the individual.

The WHO classification of Impairment, disability and handicap, in that for the individual to fulfil their role as a 'normal' member of society, the person with a disability is expected to change, rather than the environment, has been widely criticised and in response to this criticisms toward the ICIDH the WHO instigated the development of the ICIDH-2, which later became known as the *International Classification of Functioning (ICF)*(WHO, 2001). The ICIDH-2 (International Classification of Functioning, Disability and Health) has been based on an attempt to integrate both the social and medical models of disability⁴ ICIDH-2 now provides a: "... *multi-perspective approach to the classification of functioning and disability as an interactive and evolutionary process.*" (WHO, 2000: p.21).⁵

Accessibility is defined as meaning that people with disabilities having access, on an equal basis with others, to the physical environment, transportation, information and communications technologies and systems (ICT), and other facilities and services.⁶

4 Barnes, 2000; Barnes and Mercer, 2004; World Health Organisation, 2000: p.23

5 ICIDH-2 (International Classification of Functioning, Disability and Health) has been based on an attempt to integrate both the social and medical models of disability (Barnes, 2000; Barnes and Mercer, 2004; World Health Organisation, 2000: p. 23) All ICIDH-2 definitions are available at

<http://apps.who.int/classifications/icfbrowser/>

6 Source: European Disability Strategy 2010-2020: A Renewed Commitment to a Barrier-Free Europe



3 Legislation and policy context

3.1 Universal service directive

In 2009, the revised Universal Service Directive invited Member States to “ensure that access for disabled end users to emergency services is equivalent to that enjoyed by other end users”.

3.2 Policy context

In the Charter of Fundamental Rights of the EU (the Charter), the Union recognises and respects the right of persons with disabilities to benefit from measures designed to ensure their independence, social and occupational integration and participation in the life of the community and promoting accessibility of service.⁷ Article 1 of the Charter states that ‘Human dignity is inviolable. It must be respected and protected.’ Article 26 states that ‘the EU recognises and respects the right of persons with disabilities to benefit from measures designed to ensure their independence, social and occupational integration and participation in the life of the community.’ In addition, Article 21 prohibits any discrimination on the basis of disability.⁸

The European Disability Action Plan stressed the need for a renewed approach focusing upon the identification and removal of the various barriers preventing disabled people from achieving equality of opportunity and full participation in all aspects of social life, setting in motion a process of empowering people with disabilities, for the benefit of all.⁹

Persons with disabilities include those who have long-term physical, mental, intellectual or sensory impairments which in interaction with various barriers may hinder their full and effective participation in society on an equal basis with others (Article 1 of the UN Convention on the rights of persons with disabilities). The rights recognised by the Convention cover almost all policy fields (accessibility, employment, education, health, independent living, civil rights) and defines mixed competences between EU and Member states (all the MS and the EC signed the UN Convention) and both will, to the extent of their competences, have to comply with the obligations to ensure the rights recognized in the Convention¹⁰.

4 Challenges

Accessibility of 112 concerns all users, who face any restriction or lack (resulting from an impairment) of ability to communicate without hindrance with rescue services.

One of the challenges is to face the needs of deaf and hard of hearing citizens, who need an alternative communication channel to the emergency services as their disability limits their communication options. About 9% of EU’s total population, 44 million citizens, are deaf or hard of hearing. While a majority of hard of hearing citizens can use voice to communicate with emergency operators, a large number of deaf citizens and people with severe hearing impairment have to use other means to be able to communicate. Other citizens with special needs, including those with speech disabilities and cognitive disabilities, face problems with access to emergency services.

The current systems deployed all over EU at PSAP level are predominantly voice-centric (focused on communication via voice). Thus, according to the European Commission, 112 services are accessible for users with a disability only in 7 EU countries¹¹. This means people with disabilities are discriminated against while accessing emergency services

The general aim shall be enabling access to 112 and existing national emergency numbers for people with disabilities in an equivalent manner to that enjoyed by other end-users. People with disabilities shall be able

7 Source: <http://ec.europa.eu/education/grundtvig/doc/conf10/w7/grieco.pdf>

8 Source: Charter of Fundamental Rights of the EU

9 Source: European Disability Strategy 2010-2020: A Renewed Commitment to a Barrier-Free Europe

10 30 March 2007: the European Community signs the UN Convention; Council Resolution 2008/ C 75/01: invites the Commission to begin work on a new EU Disability strategy to succeed the current DAP assessing how national actions reflects EC and MS commitments to fully implement the UNC and considering setting consistent and comparable national targets

11 Source: http://www.reach112.eu/view/en/registration/issue_1.html



to use their everyday communication means (e.g. terminal equipments and services) for reaching emergency services.¹²

5 Issues for 112 accessibility

What is needed to ensure an equivalent access to emergency services?

Today's emergency services are almost voice-only capable and only a marginal share of data and multimedia is used by European Public Safety Answering Points (PSAPs). Inherently, improving access to 112 for deaf and hard of hearing citizens and other citizens with special needs induces enabling PSAPs to handle their modes of communications such as text and sign-language and thus implementing access to 112 through text and video.

In order to offer a highly accessible 112 service, it is important to keep in mind the following aspects:

- Speed – is the access time to the PSAP and the duration of the conversation reasonable?
- Reliability – does the solution make sure that citizens can access 112 and call-takers can understand the emergency call (request) in all cases?
- Mobility – can (or could) citizens access 112 everywhere in their country and Europe and not only at local level?
- Availability – is the tool readily available, used or potentially used by a majority of concerned citizens?
- Cost – is the cost of the device (or the costs of its use) bearable and in line with the requirements for 112 (call free of charge)?

Media and modes of communication as an important factor of usability.

Large disparities in Europe are reflected also by factors such as:

- Availability of text phones and text telephony services
- Availability of Total Conversation terminals and services
- Availability of relay services (sign language, text to voice, captioned telephony, speech-to-speech)
- Level of provision for necessary functional requirements at PSAPs (actual integration of identified solutions/tools into PSAP systems)

6 Solutions description

Solutions in the context of the call-handling procedure, addressing the needs and communication-related limits of specific target groups of users with a disability, including the deaf-blind and people with mental disabilities, are discussed further in this subsection.

6.1 Functional Requirements

Functional Service Requirement	Description
Restorability	Should a disruption occur, services must be capable of being reprovisioned, repaired, or restored to required service levels on a priority basis.
Reliability / Availability	Services must perform consistently and precisely according to their design requirements and specifications, and must be usable with high confidence.
Accessibility	Services and terminals utilisable by target groups
Routing	Routing to the most appropriate PSAP has to be ensured, based on the caller's geolocation (among other factors). A mechanism for service specific routing (e.g., specific relay service) is needed. There should also be a way to use the communication preferences of the caller if

12 Source: <http://www.europarl.europa.eu/document/activities/cont/201104/20110413ATT17668/20110413ATT17668EN.pdf>



he/she had registered them in their terminal or operator provided service. It includes media required in both directions as well as language used for communication. This could give indication to the operator or called PSAP if a translation/relay service needs to be inserted in the conversation.

Roaming	Based on the REACH112 project experience (www.reach112.eu), it should be noted that citizens with disabilities (e.g., deaf and hard of hearing) may only be served appropriately in their home country. (For instance, a Swedish deaf citizen might only be served appropriately if a Swedish Sign Language relay service can communicate with both the citizen and a Swedish speaking PSAP operator.) In this case, the call could be routed to the home country and the emergency information passed from the national PSAP to the PSAP responsible in the visited country. ¹³
Prioritization	all emergency communications have to be prioritised over other communications in order to guarantee quick and reliable access to the PSAPs
Call back	PSAPs should always be able to call back using the original media. Call-back shall include the same extra services, such as relay services, that were included in the original call.
Impact management	High call volume management techniques should be made available (e.g., call clipping, recorded message in PSAP or originating network) PSAPs should also be able to interrupt the communication. There also should be a mechanism to prevent accidental emergency calls
Communication with PSAP when voice is inappropriate	PSAPs should also be able to prevent the citizen's device to make alerts (visible/audible). For instance, in case of a hostage situation, the PSAP shall have the means to make sure that the citizen's phone will not ring
Mode conversion support	Text to speech and speech to text On speech, add text Sign language to speech and speech to sign language Weak voice <> supported speech ¹⁴ Real-time text availability during these modes for short items of text transfer during mainly voice or mainly sign conversation.
PSAP adding media to a text-initiated emergency call	PSAP should also be able to add media in case of a "voice-initiated emergency call". For instance, video should be used when relevant for PSAPs e.g., when the emergency situation is not well described and when the PSAPs believes that video could improve the intervention. PSAPs should have the possibility and the responsibility for activating the video stream, unless there are specific needs for the callers in the context of a particular set-up (e.g., a sign-language user that is recognised as such by the PSAP network).

6.2 Solutions deployed in Europe

In several EU countries such as the Netherlands, Sweden and the United Kingdom, **legacy text phones** provide access to emergency services. In Sweden the number 112 is used and the call is handled directly by a PSAP. In the other countries dedicated long emergency numbers are used, and the text is interpreted to voice by a relay service so that the PSAP can dispatch the necessary resources.

Fax is also used in several EU Member States such as France and Belgium. In practice, deaf and hard of hearing citizens were provided with A4 sheets to be faxed in case of an emergency. The process is recognised as slow and, once again, can hardly be used outside homes.

13 Source: http://www.reach112.eu/ressource/static/files/NOVES_REACH112_position_FINAL.pdf

14 Source: http://www.eena.org/ressource/static/files/2009_06_22_Total_conversation.pdf



Location-based solutions have also been trialled. Citizens can send a pre-registered message to 112 along with GPS coordinates in an emergency. Unfortunately, this has so far involved carrying an additional dedicated device with the sole purpose of emergency and assistance while deaf and hard of hearing citizens want to use the same phones they would use for person to person communications (e.g. mobile phones).

Another range of proprietary solutions have been implemented, usually at regional or local level. They comprise **proprietary chats and web services** that are usually developed under the leadership of emergency services. While these tend to use modern means of communications, they are often unfamiliar to the end-users who wish to use standardised daily communications. Moreover, these services only function in specific areas.

Smartphone Applications in case of emergency are being deployed quickly on the market. They can easily be downloaded by end-users and are part of the quick development of the smartphone market in Europe. Unfortunately, they are usually working only in specific regions/areas and they tend to use proprietary technologies, thus they usually do not provide access to emergency services all over Europe.

Emergency SMS is functioning or being implemented in several EU countries such as Luxembourg, Estonia, Sweden and the United Kingdom. Person to person SMS is widely used by deaf and hard of hearing citizens, thus it is easily implementable and usable. However, several concerns have been raised concerning the network delay of transmission for SMS as well as the duration of emergency conversations (10 to 18 minutes). The availability of location data for 112 SMS has also been reported as lacking in most cases. Registration to a national emergency SMS service is needed in most cases and a foreigner visiting a country where the service is implemented would not be able to send an SMS to 112 unless he has previously registered. In some cases the registration process, if via SMS, would not work (in this case as the SMS is sent to the "home" network and would never reach the "visiting" PSAP). Working Example: A 112 SMS sent by a Swedish tourist in Ireland would be sent to his/her home network and would not be sent to the Irish PSAP. For these reasons a majority of emergency communications experts consider it as no more than an interim solution, yet important because of the wide use of SMS..

6.2.1 Fax

It is used in several EU countries. This type of service is based on A4 sheet to be sent to a long number (not 112 or other short numbers).

Advantages

- Pre-filled sheets provide clear information about the intervention needed, it might be an easier alternative to use for people with mental disabilities.

Potential disadvantages

- Fax is not widely spread
- Very slow procedure
- Works only from home or office and at the local level only
- Special number needed
- Fax may not be received by 112 call-takers

Although **Fax** does not appear as the most satisfactory mean to reach emergency services, people with cognitive disabilities use it as their main communication tool. Modern alternatives to transfer images such as MMS, videophone or total conversation must be provided and fax will progressively fade out where it is still used.¹⁵

6.2.2 Location-based solution

are used in few countries. This type of service is based on GPS location and pre-defined sms messages and ensures that the operator can dispatch emergency services to the correct location.

Advantages

15 Source: <http://www.europarl.europa.eu/document/activities/cont/201104/20110413ATT17668/20110413ATT17668EN.pdf>



- Very accurate caller-location (outdoor)
- Pre-defined messages speed the intervention

Potential disadvantages

- Usable only for emergency or assistance, not for other communications (thus not widely spread)
- Cost is an issue

6.2.3 Chat service

with pre-registration, usually developed by 112 organisations with deaf organisations at local/regional level.

Advantages

- More conversational
- Users are familiar with chat services (MSN, Skype)

Potential disadvantages

- Usable only for 112, not for other communications (thus not widely spread)
- Works only at local/regional level
- Less interactive and conversational than real-time text, voice and video.

6.2.4 SMS to 112

SMS to 112 (or long numbers) with or without preregistration, usually developed by 112 organisations with deaf organisations at national or regional level. For further reference, please consult the EENA Operations document on SMS access to 112.

Advantages

- Widely spread communication tool
- Caller-location is possible
- Low cost solution

Potential disadvantages

- Possible delays (no priority in networks)
- Less interactive and conversational than real-time text, voice and video. Conversation may last in some cases for more than 10 minutes (while technical delay concerns are in practise much less severe than the human usability aspects, with factor like time needed to compose a message or selecting the right information to be typed in support of effective emergency services intervention), making this form of communication less recommendable for effective communication in the context of 112 services.
- Some disabled users do not use written language as means of communication, thus their ability to use sms as a tool of communication in emergencies is very limited

SMS is often used by hard-of-hearing and deaf people but this means is not fully satisfactory for different reasons: SMS can be put in a queue along with all other messages or even get lost; SMS is a store-and-forward medium which is difficult to localise and can hinder the interaction between emergency services and users . A reply can be found in solutions that prioritised text messages that are dialled to emergency services.

6.2.5 Use of relay services (e.g. sign language to voice)

For individuals who are deaf or hard of hearing, telephone communication can involve communicating by text rather than by voice, typically using a textphone (Called TTY in North America, Minicom in UK, texttelefon in Sweden, DTS in Italy, teksttelefon in Norway etc.). A basic textphone consists of a keyboard, a display screen, and a modem, which operates over standard telephone lines. If a deaf individual is communicating with another textphone user, both users send and receive text. If a deaf individual is communicating with a hearing individual who doesn't have a textphone, they will use the Text Relay Service (TRS). The TRS is a service in which relay operators provide two-way translation between spoken word and typed text.



The Sign Relay (Video Relay Service, also sometimes mentioned as VRS) is similar to the TRS, but a relay operator provides translation between spoken word and Sign Language (SL), rather than spoken word and text. The hearing user communicates by voice, the non-hearing user communicates by video using SL, and the relay operator serves as a liaison, communicating by voice to the hearing party and by video using SL to the non-hearing party. VRS is an important alternative to the original TRS, since many individuals with hearing impairments prefer SL as their primary method of communication. VRS can occur over Internet connections with video conferencing software, Total Conversation terminals or over special video-equipped phone terminals.¹⁶

Deaf-blind variation - computers with braille displays also exist for people who are deaf-blind, enabling the use of a computer with textphone software with a Braille or regular keyboard and a refreshable Braille display or LVD (Large Visual Display). A relay call of a user who is deaf-blind can be performed in the same way as a relay call of a textphone user, however, the text transmission speed is often reduced to increase the ability of the user who is deaf-blind to comprehend the moving braille on the braille textphone or large print on the LVD. Relay operators for deaf-blind users must be familiar with Braille abbreviations that users who are deaf-blind may use.¹⁷

IP based Text Relay Service or Web-based text relay services - IP based Text Relay Services are also called Web-based text relay services in Europe. There are internet relay services, called IP based Text Relay, that provide functionality similar to textphone to voice services, replacing the textphone and telephone line with a specialized computer or smartphone program and internet connection. In Europe, calls to the emergency services (112) are placed via the regular text relay services or directly with textphone to the PSAP.¹⁸

Advantages

- Can ensure equal communication access to the telephone service for people who are deaf, deaf-blind, hard of hearing and speech disabled
- Services can be made accessible without geographic limits, tailored to the needs of specific groups of users with disabilities

Potential disadvantages

- Requires a developed infrastructure for service provision, including well trained relay operators
- It is not possible to identify the exact location of a caller using an internet service (IP relay service)
- Provides an indirect communication that may cause the user to not exactly know what communication takes place with the PSAP.

6.3 Benchmarking¹⁹

	Speed	Reliability	Mobility	Spreadability	Cost
Fax	--	-	--	-	+
LBS	+++	+	+	--	--
Chat	+	+	-	--	+
112 SMS	--	--	+++	+++	+++

Various trials in the EU countries have revealed that:

- Fax is a slow procedure that requires pre-registration of users

¹⁶ Source: <http://www.washington.edu/accessit/articles?1111>
¹⁷ Source: http://en.wikipedia.org/wiki/Telecommunications_Relay_Service
¹⁸ Source: http://en.wikipedia.org/wiki/Telecommunications_Relay_Service
¹⁹ Source: http://www.reach112.eu/ressource/static/files/2010_05_28_REACH112_EGEA_final.pdf



- SMS is relatively widely used but less effective in an emergency due to unforeseeable time transmission, limited ability of some disabled users to express through written language
- Specific proprietary chat services implemented at local level will not spread all over Europe (as it is proprietary service, PSAPs have to pay for this software).²⁰

7 Total Conversation and Real-Time Text

Total Conversation and Real-Time Text are internet based solutions. They can be used on many devices (mobile phones, laptops, text phones, total conversation phones, etc) and can provide direct 112 access and/or invoke relay services (text, sign language to voice). Enables consistent voice, text and video communication at the same time and in real time.²¹

Advantages

- Extension to traditional telephony
- Developed by deaf community and not 112 emergency services
- Enables several means of communications (text, sign-language, lip reading...)
- Very conversational
- Standardised, fast, mobile and cheap service

Potential disadvantages

- Very recently standardised solutions are needed for proper routing and location information provision.

Total Conversation is a universal and standardised set of communications enabling citizens to communicate with voice, video and real-time text that was developed and supported by deaf and hard of hearing stakeholders. It permits person to person communications either directly or indirectly using a relay service that serves as a interpreting service between voice, sign-language and real-time text. Not only deaf and hard of hearing citizens can communicate with each other but they can also connect to the mainstream community and services through direct communications or relay services.²²

In addition, Total Conversation can be implemented in a large number of devices such as PCs, laptops, smartphones, videophones, tablets and is able to bridge with legacy devices such as textphones.

The REACH112 project (2009-2012) was partially funded by the European Commission to provide an efficient and reliable access to 112 in five countries: France, Sweden, Spain, The Netherlands and The United Kingdom using Total Conversation. In these Member States, citizens are provided with devices and software clients while PSAPs were equipped with hardware and software to handle these emergency communications. All deployments are based on a large set of recognised international standards by ETSI, the ITU or IETF so that to ensure European and international interoperability.

In the project, tests and deployments show that emergency conversations are quick and reliable. As opposed to emergency SMS, citizens "call" 112 and get an instant response from emergency operators. A conversation follows with text (every letter typed is seen instantly by the recipient in real-time) and/or with video using a sign-language interpreting service or a lip speaker (for hard of hearing people). The immediacy of the emergency conversation can therefore be preserved.

7.1.1 Providing emergency services with valuable media and data

Total Conversation is a major component of the Next Generation 112 (NG112) service that promotes emergency services over IP and thus to enable PSAPs to be contacted all media such as text and video. The concepts are recognised and standardised by the IETF-ECRIT, a leading international standards development organisation in its IETF RFC 5012 and IETF RFC 6443.

Total Conversation does not only serve people with disabilities but every citizen willing to communicate with emergency services using multimedia. We can see the demand for this in the practice of posting video recorded on mobile phones at emergency and disaster scenes. The REACH112 project demonstrates that live video stream from mobile and other devices could be provided today to emergency call-takers. Video

20 Source: http://www.reach112.eu/ressource/static/files/2009_12_09_REACH112_112access.pdf

21 Source: http://www.eena.org/ressource/static/files/2009_06_22_Total_conversation.pdf

22 Source: http://www.reach112.eu/preview/en/registration/issue_1.html



facilitates communication between citizens and emergency services and enables the transmission of live video streams in case of an incident. In locations where signal strength is a problem, the smartphones can still deliver voice and text conversation with emergency service call takers. Real-time text only can be used in specific situations (e.g. hostage situations) to contact emergency numbers and engage a quick and reliable conversation. Important data such as the caller-ID and the location information can also be provided to PSAPs.

7.1.2 How can Total Conversation be implemented?

At PSAPs, installing Total Conversation requires an IP-connection, either integrated in the emergency service IP-network or separate. Standard Total Conversation contact centre clients are easily implementable in a standalone console but can also be integrated or semi-integrated with the standard call-taking interface used by the PSAP. Call-takers can be warned of an incoming Total Conversation call via easily customisable warnings (pop-up, light, ring, etc...). Conversations can be recorded as per the PSAP policy. Location data can be provided by the Internet Service Provider (depending on national deployments and regulations). Emergency services authorities can customise the Total Conversation or access to 112 in many ways: direct calls to 112, calls to 112 and direct invocation of relay service, calls to 112 and invocation of relay services when needed, calls to relay service and then to 112, and so on.

7.1.3 Devices potentially useful as communication tools

- PC/Laptops
- Videophones
- Textphones i.e. telephone with a screen and a keyboard, designed for people with hearing problems.
- Mobiles 3G video phones
- Mobile text phones
- Smartphones
- Total conversation phones
- IP devices

European Parliament Resolution on Sign Language 1998 (B4-0985-98) asks to “ensure compatibility of telecommunications text and videophone equipment for deaf people across Europe.”²³

7.1.4 Challenges for emergency services²⁴

- Adaptation of emergency services to new media: video and real-time text
- Getting exact caller-location information
- Training staff for specific needs of disabled users in the context of communication
- Definition of standards for operation procedures related to provision of services in this segment at PSAP level, ensuring quality of service management and mainstreaming of service-related policies (in preparation for open standards, explained below)
- Ensuring interoperability to guarantee speed, coordination and transfer of information across Emergency Services as these are key in providing effective reaction and response to incidents and disasters. Issues to be addressed in the context of interoperability include sharing, formatting, storing and retrieving data and providing access to data for relay services.
- Improving point-to-point (P2P) communications
- Preparing for the deployment of NG112 services once they become standardized: the growing use of multimedia and IP communication calls for open standards widely adopted by PSAPs across regions for data exchange. Such standards should allow interoperability with automated systems (e.g. eCall and sensor networks)²⁵

23 Source: <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX:51998IP0985:EN:HTML>

24 Source: EENA

25 Source: Interoperability of emergency services and CAP, Another NG112 aspect, Uberto Delprato, IES Solutions



7.1.5 Improving point-to-point (P2P) communications

While people with disabilities find it hard to communicate with the existing solutions, the REACH112 project (described in more detail in the Annex) provides modes of communication so that they find a way to communicate in each situation, may it be with a live real-time text conversation, with sign language, with lip reading, with voice or with any simultaneous combination of these modes described by the concept of Total Conversation. Users will also be able to communicate with each other via the Internet, across national boundaries. Appropriate signal routing is one of the challenges that will have to be addressed in this context if phone number calling is desired.

8 Call Management procedures

- When using SMS and text telephone, emergency services shall provide acknowledge of receipt to say that the emergency contact has been received, the emergency is being handled and when emergency services will be on place.
- Operators who handle contact via videophone and total conversation shall be able to answer using sign languages. For this specific issue, the call could be processed using both emergency services and sign language relay centre.²⁶
- Procedure of pre-registration of users (can serve as a measure to eliminate hoax calls and identify caller specific communication needs by verifying user, support collection of statistical data)
- Pre-configured messages (can support users not able to use written language well and or fast enough) Pre-programmed emergency messages with easy access can also be created.²⁷
- Integration of a PSAP Policy on silent, hang-up and abandoned 112 calls reflecting upon the option, that the call is silent as the person who might be in a real emergency situation is not capable to speak and/or hear that the call has been answered into standard operation procedures (SOPs).²⁸

9 Relevant previous and parallel activities at international level²⁹

- The INCOM report COCOM 04-08 pointed out the cumbersome situation for emergency service access for people with disabilities in Europe, and proposed solutions.
- The EAAC committee organized by FCC in USA, will soon be releasing their recommendations for accessible NG911. More information available at <http://www.fcc.gov/encyclopedia/emergency-access-advisory-committee-eaac>
- ETSI EMTel DTS 103 170 Total Conversation access to emergency services. Ongoing standardisation in ETSI on part of the topic.
- 3GPP NOVES activities. Actions are underway in 3GPP for enabling access by multimedia telephony and text messaging to emergency services for IMS mobile and fixed services. Changes are made to 3GPP TS 22.101 service description and now continues in the detailed technical level. Recommendations
- Creation of programmes involving users (for ex. through their associations) in related solutions development, enabling them to voice needs and expectations, give feedback on user-friendliness of tools and solutions, ideally also through their participation on institutionalised monitoring and evaluation mechanisms and ideally in the service provision.

26 Source <http://www.europarl.europa.eu/document/activities/cont/201104/20110413ATT17668/20110413ATT17668EN.pdf>

27 Source <http://www.europarl.europa.eu/document/activities/cont/201104/20110413ATT17668/20110413ATT17668EN.pdf>

28 For further reference, please consult the EENA Operations document on Emergency silent, hang-up and abandoned 112 calls

29 Information kindly provided by Gunnar Hellström



- A recommendable example of a systematic approach for active inclusion would be the creation of relevant educational programmes and employment opportunities for disabled call-takers (in line with the European Disability Action Plan).

An example of best practice is the French project involving a deaf 112 operator, coming to the conclusion that Total Conversation platform with deaf operators and relay centre capabilities will ensure that all calls are adequately responded to, the needs well evaluated and the user's information (name, address, phone number) correctly understood, allowing local emergency services to give the best possible answer.³⁰

- Introduce a PSAP policy on silent, hang-up and abandoned 112 calls reflecting upon the option, that the call is silent as the person who might be in a real emergency situation is not capable of speaking and/or hearing that the call has been answered, actively create an alternative means to contact the emergency services.³¹
- Dissemination of information on access to emergency services - informing people with disabilities on how to contact and use emergency services is crucial. Websites owned by emergency services, public bodies with responsibility for emergency services and telephone operators should be accessible. Information made available to the public should also be provided in alternative formats.³²
- A pro-active communication strategy between 112 service providers and disabled users should be put in place, supporting their understanding and knowledge of how to use 112 services. Following the example of Iceland, encouraging people who may need to rely on 112 sms in case of an emergency, to save draft messages in their cell phones with information that may be important, such as their medical condition, contact information, nature of possible emergencies³³.
- Educating the disabled users as well as general public on how to use 112 services, in order to reduce the number of inappropriate calls and increase the amount of time that can be dedicated by call takers to users with special communication needs.

For example in Lithuania only about 25% of all answered emergency calls end in dispatch of emergency field units. From the rest 75%, about one third are considered silent calls (1-8 seconds long). Such number of calls causes huge unnecessary load on 112 operators. If every single call would be called back, this would significantly affect call answering time to those in real emergency. So a "silent call policy change" should be implemented in parallel with continual education activities, teaching the public how to use 112 in order to reduce the number of inappropriate calls.

A pilot project initiated by the Ministry of Interior of Slovakia (launched in 2009), aimed to explore needs and facilitate access to 112 services for users unable to use voice-based services, pointed to a need to dedicate attention to the emergency-related sign-language basic word stock of those, using sign language as the primary form of communication. The working group tasked with preparing possible 112 accessibility-related solutions included deaf young people, who reported difficulties in communicating specific emergency-related issues via sign-language in spite of the fact, that they use it as their primary means of communication and have been involved in secondary level formal education (for example finding the "right" sign-language sign for perceived chest pressure accompanying a possible heart-attack has proven to be a challenge. The implementation team of this pilot project thus recommends closer attention to be paid to the education of disabled users, with special emphasis on communication skills (with special focus on personal healthcare related knowledge and emergency-related situations)³⁴.

- Development of programmes preparing operators for specific needs of the target groups in the context of communication (systematically supporting effective communication with disabled service users).

30 Source: http://www.eena.org/ressource/static/files/04__Melanie_French_Pilot_HenaultTessier_Mongourdin.pdf

31 For further reference, please consult the EENA Operations document on Emergency silent, hang-up and abandoned 112 calls

32 Source: <http://www.europarl.europa.eu/document/activities/cont/201104/20110413ATT17668/20110413ATT17668EN.pdf>

33 Source: http://www.eena.org/ressource/static/files/2009_06_22_112_sms_in_Iceland.pdf

34 Source: Anna Smehilova, NGO EFFETA, Slovak Republic



10 EENA Requirements

Requirements	
Availability of a solution	Availability of a solution for communication with disabled users.
Procedures	Availability of established procedures for management of communication with disabled users.
Reliability / Availability	Services must perform consistently and precisely and must be usable with high confidence, based on 24h/365 days service provision.



ANNEX Implementation in different countries

National and European initiatives and projects³⁵

New EU telecoms rules adopted in December 2009 strengthened the 112 provisions further, in particular by requiring Member States to:

- ensure quicker provision of caller location information
- raise awareness of 112 amongst travellers
- improve access to 112 for people with disabilities

These new EU telecoms rules must be implemented in all EU countries by June 2011. Together with the eCall initiative REACH112 is a flagship project for the EC.³⁶

A.1 REACH112 Project (REsponding to All Citizens needing Help)

The REACH 112 project is a three-year project partially funded by the European Commission under the ICT PSP programme. It gathers 20 partners from all over Europe, including user organisations and major global telecommunications companies. In five countries, it will deploy a new communication solution to allow people to communicate in video, voice and text simultaneously, with special focus on people with disabilities. The project will offer access to relay services to help connecting users with different abilities to others and will also provide access to the emergency services. Ultimately, the service will benefit all citizens.

The project will implement an accessible alternative to traditional voice telephony that will be suitable for all. While people with disabilities find it hard to communicate with the existing solutions, REACH112 will provide modes of communication so that they will find a way to communicate in each situation, may it be with a live real-time text conversation, with sign language, with lip reading, with voice or with any simultaneous combination of these modes described by the concept of Total Conversation. The service will be of benefit for all.

Meanwhile, there is an urgent need to improve access to emergency services for people with disabilities in the EU. REACH112 will implement a 12-month pilot in Sweden, the United Kingdom, The Netherlands, France and Spain allowing disabled users to communicate at a distance with each other and directly with the emergency services. IP devices will be provided in the homes, workplaces and on the move, connecting the users simultaneously in video, voice and text. Users will be able to connect between countries and different service providers, on mobile and fixed IP networks. The service will be integrated with existing telecommunication platforms and emergency service frameworks. The users will also connect through a third-party service (relay) with voice telephone users. Additionally, a protocol for the exchange of information between emergency services will be made available so that relevant data can be transferred to the most appropriate emergency service.

REACH112 will therefore become a blueprint for the extension of IP-based communications, Total Conversation and emergency services in the EU. It will guide the improvements of communication between all citizens - in particular those with disabilities - as well as the accessibility and call handling of all EU emergency services.

The REACH112 project is partially funded under the ICT Policy Support Programme (ICT PSP) as part of the Competitiveness and Innovation Programme by the European Community.

Programme: CIP [ICT-PSP]

Period: from 1/7/2009 till 30/6/2012

Budget: 8.8 million EUR

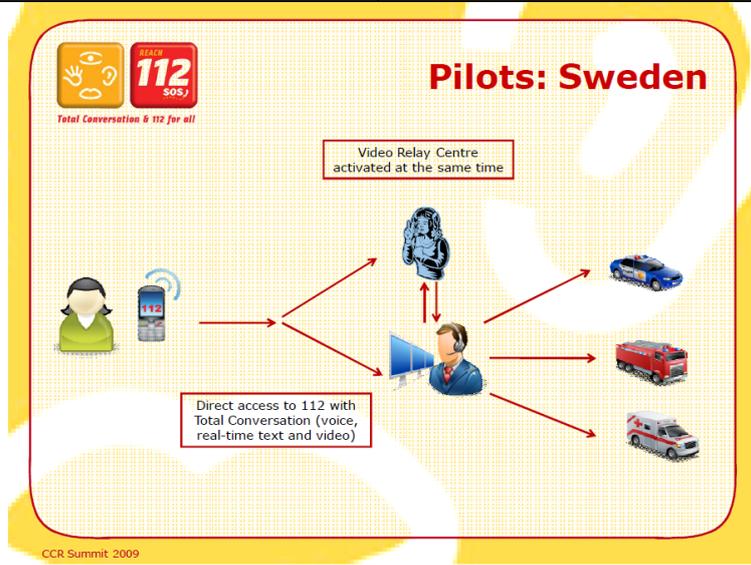
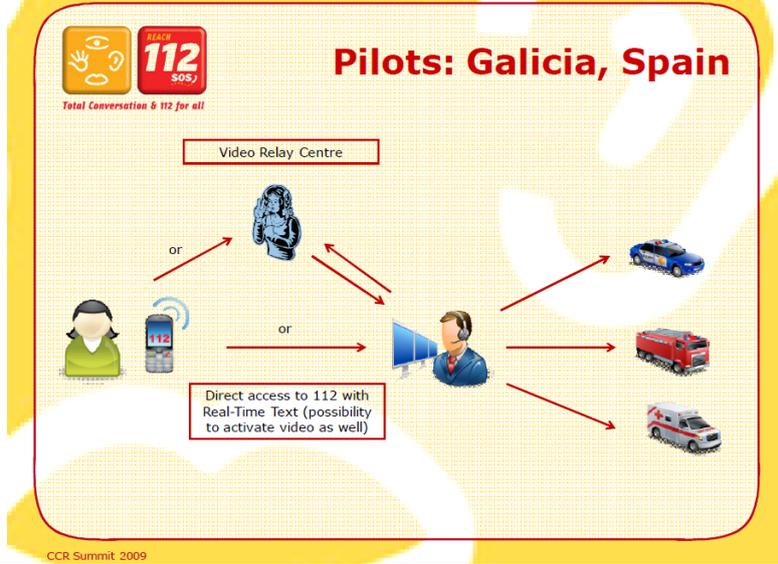
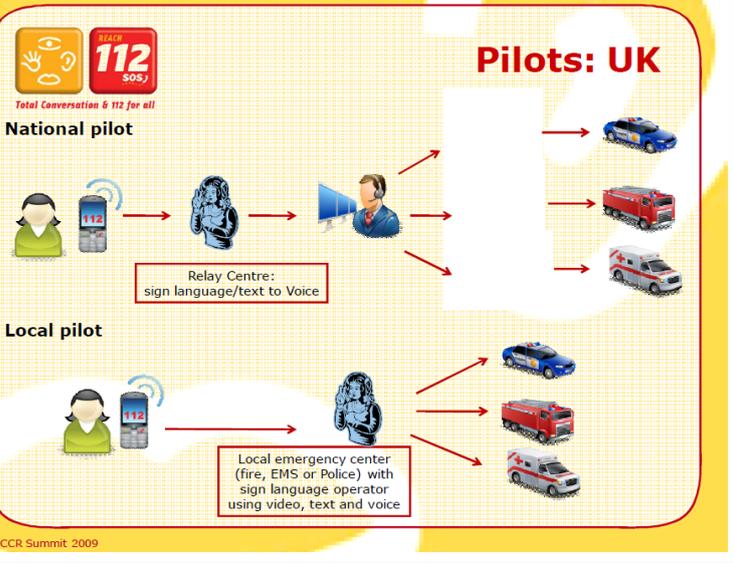
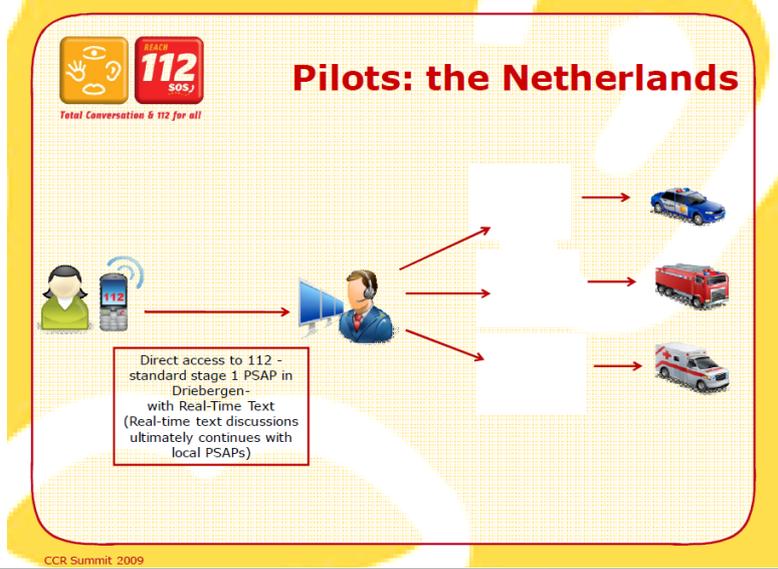
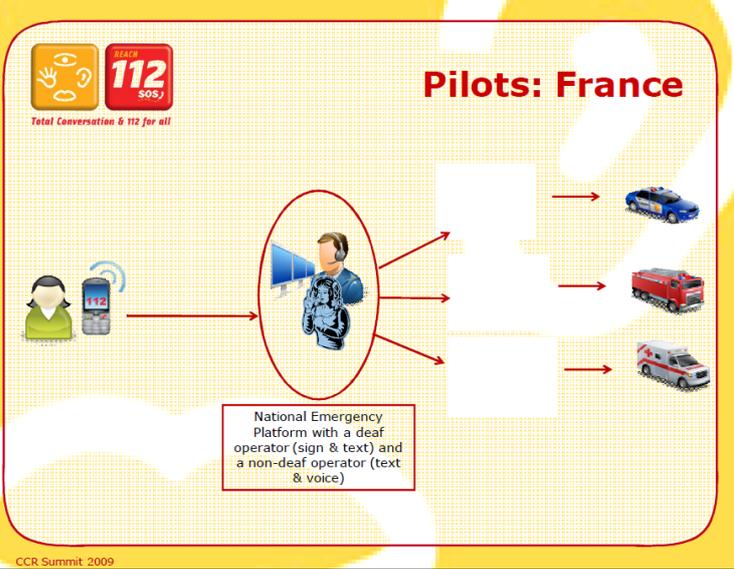
Project website: www.reach112.eu

Contact: Uberto Delprato, IES Solutions: u.delprato@i4es.it; Gary Machado, EENA: gm@eena.org

³⁵ For further reference to other relevant national initiatives related to eSMS, please consult the EENA Operations document on SMS access to 112.

³⁶ Source: http://www.reach112.eu/ressource/static/files/2010_05_28_REACH112_EGEA_final.pdf

National REACH 112 pilots:





A.2 UK Emergency services trial³⁷

Trial objectives:

- Single national access mechanism for SMS messages to the 999 service for speech and hearing impaired users
- In addition to real time text service (modem based)
- Registered users to limit use by those that have better options (open registration)
- Specific instruction when users register: users told they must continue to seek help until text is acknowledged by PSAP
- Direct access to all the emergency service PSAPs that should not need to make changes to their call handling equipment or operator training
- Access to same automated location systems that are available to voice and text phone calls

Experience from trial:

- Registered Users – steadily increasing, currently 4,365 (3/2010)
 - Registration allows conditions of use to be communicated and limits misuse of the service
 - Trial recruitment through RNID (+)
 - Websites
- Use for genuine emergencies averages 1 incident / day
 - comfort message sent early (within 1.5 minutes)
 - average duration of message exchange ~10 minutes
- Inappropriate use (from registered users!) is around 4 eSMS contacts /day
 - good intention, not an emergency
 - no clear problem/abusive
 - hoax messages (Use “barring” of MSISDN from eSMS to further reduce misuse)
- Training
 - Relay Assistants and PSAP call takers
 - Processes developed / training guides circulated
 - Limit call takers if possible / develop local experts

Summary:

- eSMS Trial with registered users in UK has demonstrated that such a service is helpful and practical to provide
- At least one life has been saved
- Trial continues with plans being progressed to make it more robust and fully prepare all PSAPs
- Likely launch date for a long term service is October 2010

More information available through John Medland, BT 112/999 Product Manager
john.medland@bt.com, Tel +44 1977 593408

A.3 112 SMS service in Iceland³⁸

112 in Iceland - 2008 statistics:

- 257.597 112 calls processed
- 0,5% SMS
- 191.410 emergency incidents (74%)
- Police 67%
- Ambulance services 16%
- Assistance from Fire Brigades 3%
- 628 to Commissions for Child Protection
- Average time to answer 3,8 sec.
- 95% answered within 8 sec.

37 Source: <http://www.eena.org/ressource/static/files/Medland.pdf>

38 Source: http://www.eena.org/ressource/static/files/2009_06_22_112_sms_in_Iceland.pdf



- 80% of F1 dispatching processed in 90 sec. or less time

112 SMS "calls":

- SMS has been used to dispatch response units for 10 years
- The 112 SMS service was developed in cooperation with representatives from the deaf and hearing impaired association
- The requirement analysis and PTT work began in May 2005
- The service was opened on April 6th 2006
- No charge for 112 SMS in the networks

112 SMS technical solution:

- The 112 system communicates directly with the mobile operators SMS service
- The 112 dispatcher can select which mobile service provider to send through
- We receive delivery confirmation from the network 2-5 seconds after sending the SMS

A.4 French pilot project – deaf 112 operator³⁹

Deaf operators working on the 112 platform

Benefits:

- Better understanding (sign language and text messages from deaf users, especially in panic situations or poor SL level);
- Faster, more efficient, more fluent communication between users and platform;
- Enhanced confidence for users and for local emergency services;
- Respect of intimacy and private life since the user doesn't have to call through a third party.
- Freedom of choice in the means of communication.

Communication diagram:

Local emergency services to be contacted through:

- 1) Bilingual operator working in pair with the deaf operator, or
- 2) Relay center

More information available through Benoît Mongourdin or Mélanie H.-Tessier, Websourd & Grenoble Hospital.



A.5. Related projects concerning 112, emergency services and accessibility

PEACE - IP-based emergency applications and services for next generation networks

The transition to next generation networks is often coupled with the vision of innovative services providing personalized and customisable services over an all-IP infrastructure. To enable a smooth transition, next generation all-IP networks need not only support more services but also support current vital services, namely emergency services. In the PEACE project we will provide a general emergency management framework addressing extreme emergency situations such as terrorist attacks and natural catastrophes as well as day-to-day emergency cases based on the IP Multimedia Subsystem (IMS). To achieve this goal the PEACE project will be addressing two major technological challenges.

[Visit PEACE website here](#)

U-2010

U-2010 stands for ubiquitous IP centric Government and Enterprise Next Generation Networks Vision 2010 and its overall objective is to provide the most capable means of communication and the most effective access to information to everybody required to act in case of accident, incident, catastrophe or crisis, while using existing or future telecommunication infrastructures.

[Visit U-2010 website here](#)

ÆGIS

[View ÆGIS description](#)

ACCESSIBLE

[View ACCESSIBLE description](#)

ASK-IT

[View ASK-IT description](#)

OASIS

[View OASIS description](#)

WISDOM - Wireless Information Services for Deaf People on the Move

[View WISDOM description](#)

Related sources of info – increasing disaster preparedness and management skills by and with people with disabilities

Disaster preparation

<http://www.jik.com/textalerts.pdf>

Active preparation and learning programmes

Feeling safe, being safe Webcasts, videos and materials developed with, for and by people with disabilities. Easy-to-use tools that employ a simple learning method, Think-Plan-Do. Uses plain language and accessible formats to ensure use by a broad range of individuals who may have limitations in reading, understanding, learning, and remembering <http://www.dds.ca.gov/ConsumerCorner/fsbs/index.cfm>

A Guide for Including People with Disabilities in Disaster Preparedness Planning

http://www.ct.gov/ctcdd/lib/ctcdd/guide_final.pdf