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1 Evaluation of the Pilot of Mature Services - Introduction

The main work of the DTV4All project is to pilot of mature access services on a full scale in four territories of the European Union.

The planning of the Pilot of Mature Access Services has two components:

- D2.1 A technical plan including the implementation of any minor additions or changes to existing services available in 2009 in Berlin-Brandenburg, Catalonia, Denmark and Italy
- D2.2 Evaluation methodologies to be used in connection with the Pilot of Mature Access Services

This document Deliverable 2.1 is the technical plan for the pilot. It should be read after reading Deliverable D1.1 which introduces mature access services.

The main metric for the Pilot of Mature Services is that it should generate inputs to dissemination documents and activities that can accelerate the take-up of mature access services across Europe.

The large-scale pilots enabled by Commission funding of the DTV4All project will allow for additional implementation of technologically mature but not yet satisfyingly implemented services. Valuable additional knowledge will be derived from the many aspects of the extended service provision on the broadcasting side and, very importantly, on the end user side as the mature services will be thoroughly evaluated through audience research mechanisms and dedicated user groups representing the respective target groups.

This document is structured as follows. Section 2 gives the technical scope of the pilot. Section 3 gives information on the service to be piloted; here service means the various access services collectively as they are intended to eventually be provided as a bouquet of services to the user. Section 4 gives the technical work plan for the pilot. Concluding remarks are made in Section 5.

2 Technical scope of the Pilot

The consortium behind the DTV4All project believes that the pilot of mature access services should be full scale in four territories. The proposed pilot encompasses:

- Mature access services [subtitling, signing (a reduced bandwidth channel) and audio description (broadcaster mix)] in Catalonia, Denmark, and Italy to be offered in all of these territories for at least 12 months with the consumer issues being evaluated by the audience research bodies of the participating broadcasters/operators.
- In Berlin/Brandenburg the current teletext subtitles will be complemented by additional new Digital Video Broadcast (DVB)-subtitles in different variants for the 12 months pilot. This service will be tested by a representative user group of 50 users recruited with the help of the respective regional disability associations already closely co-operating with broadcaster partner RBB.

The partners in the consortium will bring to the project significant own resources in the form of full-scale, mature access services (subtitling, signing and audio description).

Aims and objectives

The pilot of mature access services aims to:

- a. Offer and evaluate mature subtitling, audio description, audio subtitling and signing services in a minimum of four territories within the European Union for at least 12 months
- b. Identify improvements in existing access services and ways of addressing the key technical, organisational and legal obstacles to the sustainable take-up of these services in the timeframe 2008-2010 throughout Europe.
- c. Make recommendations regarding mature access services to the European Information Communication and Consumer Electronics (EICTA) access services forum, European Broadcasting Union (EBU), Networked and Electronic Media (NEM) technology platform and other bodies representing stakeholders in the access service value chain on the basis of which these bodies can take appropriate action in relevant standardisation bodies and consultation fora.

Main deliverables

The main deliverables of the pilot of mature access services are:

- A. A detailed workplan (D1.1) for the full-scale deployment of mature access services for Digital TV in four territories of the European Union for a minimum of 12 months' in each territory. As regards the lifecycle for mature services mentioned in the workplan, a number of distinctions need to be made. To exemplify them, here is a specific case of Audio Description in Denmark broken down into eight main phases:
 1. A political or regulatory go-ahead for the introduction of a new, mature access service in a territory where this has not yet been introduced (in the case of Audio Description (broadcaster mix) in Denmark, discussions were conducted as part of the revision of the broadcasting act and the ministerial orders (including the public service broadcasting agreement) governing the period from 2007-2010.

2. The overall planning of a new, mature service (e.g. Audio Description [broadcaster mix] that is being introduced in Denmark in the course of 2008). The planning is carried out by the executive commissioner and the distribution department at DR
3. Consultations and testing of the features of the new service with stakeholders. These include the intended audience (in this case with *Dansk Blindesamfund* - The Danish Association of the Blind, the regulator, the Danish Ministry of Culture, and the platform operator (BSD, Broadcast Services Denmark). The executive commissioner for access services and the person responsible for the technical design and implementation take part in regular meetings including a visit to the BBC to see how this is handled in practice. It is often possible to discuss how a mature service needs to be offered in relation to examples of such services elsewhere. In the case of Audio Description in Denmark it was possible to use the BBC Audio Description services as a common point of reference. *Dansk Blindesamfund* and the other stakeholders were able to agree to the features of the service on this basis.
4. Detailed planning of the new, mature service. This includes:
 - i. Concrete targets for the content category for which Audio Description is to be provided (in this case, high-end television drama) in conformity with points 1 and 3.
 - ii. A specification of the number of hours or the percentage of output for which Audio Description has to be produced (including a breakdown of the number of hours of new content, repeats etc) in conformity with points 1 and 3.
 - iii. Costing of the production (typically the cost per minute or cost per programme to create the Audio Description files)
 - iv. Analysis of changes needed in the production and transmission workflows and infrastructure leading to costing of production and transmission changes
5. Test production and validation of the new service. Production of the Audio Description files; implementing and validating changes in production and transmission. In this case the scope is restricted to digital terrestrial television with the option of expanding this to include digital satellite and digital cable at a later stage. In the case of Audio Description in Denmark, this has been going on since November 2007.
6. The new service enters operation. In the case of Audio Description, this may well be a so-called soft launch where the service is operational but not widely publicised so that adjustments can be made to production and transmission.

7. The new service is scaled up to its final target level. Subtitling for those with hearing impairments has a target in Denmark of 100% of all public service television by 2012. Scaling up raises the issue of cost-effective workflows; how does one move from subtitling of 70% of all television programmes to 100%? Preliminary discussions within the consortium already indicate that there may be scope for increasing cost-effectiveness by rethinking workflows, either by combining the production of related access services for the same programme, or by using advanced technologies behind speech recognition to produce the first iteration of subtitles which are then manually optimised. In the case of Audio Description, the level at which targets for Audio Description (broadcast mix) will be set is subject to a new round of consultations with the regulator and *Dansk Blindesamfund* in the course of the next 12-18 months. The final targets will require consensus on the part of all relevant stakeholders in order to reach agreement on a sustainable solution.
8. The service and technological disruption. In the case of Audio Description, we already anticipate the need to consider new solutions for delivering Audio Description to those with visual impairments in the next 4-10 years, as high definition broadcasting is likely to become widespread on most digital television platforms (other than Digital Video Broadcast – Handheld (DVB-H)) from 2012 onwards. At that point, there will be bandwidth constraints arising from a move from stereo to some kind of multichannel audio solution. It is likely that the bandwidth requirements for multi-channel audio will be greater than the stereo solution that it will complement and finally replace. In turn, this will provide the impetus to assess the introduction of Audio Description (receiver mix) where the audio description is decoded separately in the digital television receiver /set top box, allowing the user to determine the mix between the original audio and the Audio Description channel and its spatial positioning.
9. Phasing out a given service on one platform in favour of another. Subtitling in Denmark is offered via Teletext (both on analogue and digital TV) and DVB-subtitling. Teletext and its associated subtitle service is a sunset technology which will be phased out in the next few years. As a replacement successors are identified as High Definition – Text (HD-Text) and DVB-subtitles which will be addressed in the DTV4All project. Note that in the context of the DTV4All project HD-Text is an emerging access service while DVB subtitles appears in both mature and existing access services. For DVB-Subtitles the European Telecommunications Standards Institute (ETSI) standard EN300743v1.2.1 encompass the mature access services, while the ETSI standard EN300743v1.3.1 encompass emerging access services. There are also related, secondary issues such as Personal Digital Recorders and their ability to record and allow for the re-use of the access services associated with a given programme.

As can be seen from this case, access service audiences need to be involved as early as possible. Their participation at national level is in phases 1-4, 6-9.

What constitutes a pilot is different from case to case. For clarification tables are provided in section 4. Work Plan. One table is provided for each mature access service that highlights the main features of its piloting. This is done for comparative purposes so that the balance of effort devoted to the piloting of each service can be determined and assessed for its appropriateness.

As was pointed out in phase 3, where a comparable mature service already exists elsewhere in Europe, consultations and agreements on the introduction of a new service may be faster and cheaper by benchmarking against existing access services rather than having to produce mock-ups and tests on national audiences provided there are no cultural issues that mean that the existing national audience feedback is not transferable in this way.

What is critical for each new service is close collaboration with a national or local body that adequately represents the needs and interests of the users of the new service. In the case of those with visual impairments, the matter is quite clear-cut.

When it comes to subtitling, however, the service may be targeting multiple audiences (for example those with serious hearing impairments, older people who find it difficult to understand young people whose language uses modern slang and is delivered at a high tempo) as well as various immigrant groups for whom subtitling is an aid to their understanding of the linguistic and cultural aspects of the programme. In the short to medium-term, there will be trade-offs between the needs of these various groups. In the long-term, with the emergence of receivers with considerable local processing power, it is not inconceivable that the broadcaster will be able to offer a long-form version of subtitles that can be personalised and displayed as required by the viewer.

A pilot can also involve the setting of targets for the service as production is scaled up and finding sustainable solutions for all those involved in the production and transmission value chain c.f. phase 7.

A pilot can also entail the early identification of technologies or other events likely to disrupt an existing mature service c.f. phases 8-9. Here much of the work takes place both at national and European level, with European stakeholders such as European Information & Communications Technology Industry Association (EICTA) and the European Users of Access Services.

B. A report (D2.6) containing short-term recommendations on the ways the effectiveness and efficiency of existing services can be improved and the ways in which key technical, organisational and legal obstacles to their wider introduction across Europe can be overcome.

- C. A report (D4.4) containing descriptions of the mature access services, guidelines for their implementation throughout Europe that address:
1. Devices: Recommendations for device specifications to be adopted Europe wide based on existing DVB and EICTA draft specifications for DTV receivers (and recorders) and inputs from European territories already at an advanced stage of device and service standardisation using Video Broadcast – Service Information (DVB-SI), Digital Video Broadcast - Generic Data Broadcasting and Service Information Protocols (DVB-GBS) and related standards
 2. Content: Guidelines for the provision of subtitling, audio description and signing for various content categories on digital television
 3. Services: Guidelines for the setting up and running of access services for broadcasters and platform operators. These would include service models; business models; a listing of the appropriate standards for commissioning and producing content; Business-to-Business (B2B) and Business-to-Business (B2C) standards and formats for exchanging content and services; training of those involved in developing and producing access services for digital TV; evaluation guidelines for services
 4. Roadmaps: For the four territories of the pilot, generic objectives and timetables on the basis of which specific objectives and timetables for subtitling, audio description and signing services for digital television platforms can be agreed at national and regional level, taking into consideration the circumstances of the digital TV value chains in each territory of the pilot, each territory being in a different country.
- D. Dissemination actions on mature and emerging access services in the form of presentations, proof-of-concept materials, scientific papers and lectures. Such dissemination actions will be organised and held by bodies such as EICTA, the EBU, the NEM initiative and the committees behind international conferences. (D4.2, D4.3, D4.6)

3 Information on the service

Information on the service (1)
<p>Description of the proposed service and its innovative aspects</p> <p>The proposed Pilot is offered by internationally-recognised leaders in the value chain for access services for digital television in Europe and encompasses:</p> <ul style="list-style-type: none"> - Mature access services [subtitling, signing and audio description] pilot would be deployed in four territories: full-scale in Denmark by DR and Catalonia (Spain) by TVC for at least 12 months, and in Berlin-Brandenburg (Germany) by RBB and Italy by RAI. - User requirements elicitation and user testing concerning all offered access services involving expert users from the respective target groups - Standardisation and dissemination actions mediated through the EBU and EICTA involving pertinent bodies
<p>The owner / provider / maintainer of the services</p> <p>For the matured services, four broadcasters all of which are European innovators in the provision of access services for digital television, who already offer a wide range of such services and who will continue to do so after the pilot period. The broadcasters are: Danish Radio (Denmark), RAI (Italy), RBB (Germany, region Berlin-Brandenburg), TVC Catalonia (Spain, region Catalonia)</p>
<p>The actual users of the services</p> <ul style="list-style-type: none"> a) Users unable to hear b) Users with impaired hearing c) Users unable to see d) Users with impaired sight e) Users with dyslexia f) Users for whom the language is not their mother tongue g) Users with learning disabilities h) Combinations of the above <p>N.B. For the pilot evaluation, each individual broadcaster may not be able to cover all the user varieties listed, however, as a pilot it will</p>

Information on the service (2)
<p>The typical usage case from users point of view</p> <p>Three mature access services subtitling, deaf-signing (a reduced bandwidth channel) and audio description (broadcaster mix) will be offered in at least two of the four territories. For those with hearing impairments the services will be available for between 50-95% of the general TV output of DR and 25% of the general TV output of RBB to facilitate their understanding of programming for 1-3 channels in each territory. Deaf signing and audio description programming will also be available to improve access for two or more additional target audiences through the pilot. All services will be evaluated by representative expert user groups in their home environments.</p>
<p>How the service be sustained and who will pay the cost (e.g. end-user / public authority /mixed model etc.)</p> <p>In three of the territories, the services are (or will be) mandatory or are stipulated in the terms of the public service broadcasting agreement for the territory in question. Funding is either from licence fee revenue or a mixed mode. (licence fee and advertising revenues).</p>
<p>The technology that will be used (hardware, software, delivery channels)</p> <p>Pilot of matured services</p> <p><i>Berlin-Brandenburg (Germany):</i> Subtitling: DVB-T (Terrestrial). Clean Audio first in laboratory tests and, if feasible, with a suitable larger user group generated from the user group testing the Subtitling. Signing for assessment in laboratory tests.</p> <p><i>Catalonia (Spain) :</i> Subtitling, Signing, Audio Description: DVB-T</p> <p><i>Denmark</i> Subtitling: DVB-T, DVB-C (Cable), DVB-S (Satellite, two operators); Signing: DVB-T; Audio Description: DVB-T (2009-)</p> <p><i>Italy:</i> Subtitling: DVB-T, DVB-C, DVB-S; Signing and Audio Description: DVB-S/DVB-C</p>
<p>Specific service content</p> <p>The host broadcaster of each pilot will provide the contents.</p> <p><i>Subtitling:</i> widely available on one or more delivery platforms (teletext/DVB-subtitles) for most or all pre-recorded programmes</p> <p><i>Live subtitling:</i> available for news programming and live sport events</p> <p><i>Signing:</i> varies from territory to territory – usually covers news programming</p> <p><i>Audio description:</i> depends on territory – usually covers drama and films, rarely covers news, sports</p>

4 Work plan

For RBB, the main access service pilot activities for the pilots are DVB-Subtitling and Clean Audio.

RBB has been employing mature videotext subtitling for many years now while signing and audio description have only been employed very rarely by RBB. It will now, in the course of DTV4All, start broadcasting DVB-subtitles as a mature technology that is, however, new to its portfolio but is thought to be a future proof solution that is also more attractive for the target group.

DVB-Subtitling via digital terrestrial television (DVB-T) for the region Berlin-Brandenburg will be introduced at month 6 of the project. Up to now, RBB only broadcasts analogue teletext subtitles. In DTV4All it was first thoroughly tested and examined which technological transcoder solution was feasible enough to be used for automatic transformation of teletext subtitles into DVB subtitles. This was done for a) RBB subtitling and b) for ARD subtitling. The technology was integrated into the given play-out-environment and regular test broadcasting via DVB-T started at month 7 of the project.

In parallel, all major DVB-T reception devices have been tested in respect of their reception of DVB-subtitles produced by the preferred transcoder system. In the end, the device offering the best results in receiving and displaying the DVB-subtitles was chosen as test device to be given to the testers.

The user group encompasses 50 test users (hearing impaired and deaf test persons) recruited with the help of the respective user associations in Berlin-Brandenburg. The DVB-subtitles are played out to 1.6 million reception devices in the area.

Clean Audio is not yet a mature service however it employs mature technology for its production. In DTV4All, Clean Audio is understood as an emerging service and therefore dealt with in WP3. It is, however, mentioned in this deliverable as RBB would like to use its user testing structure of mature services (i.e. DVB-subtitles) for testing Clean Audio services. Here, RBB will co-operate closely with IRT. As Clean Audio is not yet being employed as a mature service, RBB will at first perform small scale laboratory tests in order to provide feedback to IRT and their developments. Later on, RBB plans to test IRT's development with a larger user group that is recruited from the 50 person DVB-subtitling user group. Further details are summarised in Table 1 below.

For DR, the main mature access service pilot activities include:

1. Audio Description (AD) [broadcaster mix] for high-end TV drama covering phases 4-7 of tables 2 and 3 below on digital terrestrial television
2. AD [broadcaster mix] for high-end TV drama covering phases 4-7 on DVB-S and DVB-C
3. AD [broadcaster mix] phases 8-9 for all DVB platforms in connection with the transition to high definition.

4. Identifying and promoting general, DVB-SI based solutions that allow for the identification of access services such as AD and signing without introducing cognitive clutter in Electronic Programme Guides (EPGs).
5. Signing for those with hearing impediments (phases 7-9) on digital terrestrial television (finding a new solution as the current one does not scale from a technical perspective)
6. Subtitling on digital terrestrial television for multiple target audiences (phases 8-9) in connection with the transition from standard definition to high definition digital television (DVB-T, DVB-S, DVB-C; Digital Video Broadcast – Terrestrial, - Satellite, -Cable).

For the pilots run by DR the main mature access signing service pilot activities of DR are summarised in Table 2 and the main mature audio description pilot activities of DR are summarised in Table 3.

RAI will contribute to the analysis and evaluation of existing mature access services delivered over Digital TV by:

- Providing Italian TV contents with subtitling
- Providing Italian news programmes with sign language, script in natural language and verbatim script of the signs (sequences of words representing the signs)
- Providing expertise in speech recognition for subtitling
- Providing expertise in avatar technology for signing

RAI will evaluate these services with a user group of 50 deaf, hard of hearing and hearing persons,

TVC's activities in DTV4All comprise the execution of three pilots of three accessibility services, two mature and one emerging, plus the exploration of variants of these services in different platforms derived from different forms of TV delivery and alternative forms of accessibility services in use.

The summary of each pilot contains a description of the technologies that are to be used. These technologies are ready to be used and have been tested in real conditions by TVC. This means that auxiliary applications, subtitle editors, audio description creation systems and all the necessary tools are operative. However, the stable exploitation of the services may require adaptations only in order to increase automation and reliability. TVC will contribute to D1.1 a detailed workplan of its pilot cases

a) Pilot about Audio description

Month 8/10-20/22

- Pilot of mature services on audio description planning, implementation and launching with a minimum frequency of one TV program each week.
- Evaluation of results. Design of strategy. Forms of contact with users through their associations
- Benchmarking & Best practices recommendations about projects of mature services

- Vision about other emerging and alternative services
 - On line delivery of audio description. Different scenarios feasible. Technological proof of concept of services.
 - Digital Terrestrial Television (DTT) audio description user mixing. Technologies and practical applications
 - Other forms of delivery. Individual use of audio description in the familiar living room. Personal audio description channel.

Month 21/23-32/34

- Benchmarking & Best practices recommendations of mature services on audio description. Information interchange and common work with partners
- On line delivery trial
 - Planning trial
 - Evaluation plan
 - Trial
 - Evaluation
- DTT user-mix tests and evaluation (depending on Decoders availability)

Month 33/35-38/40

- Benchmarking & Best practices recommendations for new services

About the technology to be used in this pilot:

(Technology already developed, implemented and tested in real conditions by TVC)

- 1) Receiver side: Set top box or integrated TV receiver conforming to DVB, with capability for multi-audio choice.
- 2) Transmission: Broadcasting via Digital Terrestrial Television (DVB-T). Audio description can be chosen in the language options as “ad” (not all DTT receivers keep the ident. Audio bandwidth is 96 Kb. Audio codification is Moving Picture Experts Group - 1 (MPEG-1), Layer2 (L2).)
 - All audio commentaries are stored in a server. When the general Broadcast Automation System is prepared for future broadcastings, there are a field that checks if the program is to be broadcast with Audio Description (AD). This causes sending of AD from this store to a server of play out of AD files (in MPEG1, L2) and also the volume commands.
 - In the moment of broadcasting TV program (Serial Digital Interface (SDI) video with embedded audio without AD is de-embedded and mixed with AD (balanced according to the corresponding volume index). Then the AD mix is embedded with video as an additional audio option and sent to the DVB transport stream encoder

3) Production of Audio description. A copy of the tv-program is delivered to operators and speakers as wmv files (with time code burnt over the images) by means of Compact Discs (CDs), Digital Versatile Discs (DVDs), or as files through an Internet Protocol (IP) network. The operator and creator of audio descriptions returns the audio description as a file *.nar, consisting of a compressed file (analogous to *.zip) packing an Extensible Markup Language (XML) file containing a list of Society of Motion Picture and Television Engineers (SMPTE) time codes of starting and end of each description, the text of each commentary, a series of audio files corresponding to each commentary, and a level of attenuation for the audio of the film to assure intelligibility.

- The MSWindows tool for creation of the audio description is analogous to the application that is used for the creation of subtitles.
- The program advances by scenes previously prepared.
- Prior to voice recording, commentaries are written for each scene. There are graphic tools to evaluate the capacity of the duration of each scene to fit the audio commentary.
- Then, operator-speaker can read and record its voice. There are audio level meters to monitor level and visual time bar to monitor fitting of commentaries in available time.
- Result is a series of MPEG-1 Audio Layer 3 (MP3) audio files linked to the time code points of the video) in and out). Furthermore, each narration audio clip can have an associated volume level (there are 4 possible levels) related to the volume of the sound of the program in reproduction.

b) Pilot about Signing

Month 8/10-20/22

- Identification of suitable services for signing delivery.
- Identification of types of services: Preferences between types of programs.
- Pilot of signing over Digital Terrestrial Television (DTT).
- Signing over IP. Work flow models for signing. Forms of production of signing video-signal. Direct, delayed, etc.
- Available delivery technologies DTT, IP, etc. Proofs of concept over computer displays and tv-sets. Picture in picture DTT capabilities.
- Bitrate compromise on independent TV channel.

Month 21/23-30

- Recommendations for planning and implementing signing services. Contribution to draft.
- Evaluation trials
 - Planning. Special and continuous feedback from users. Contacts with users associations.
 - Evaluation of feedback from users. Iterations.
 - Conclusions

Month 24 -30

- Final recommendations contribution

About the technology to be used in the signing pilot:

1) Receiver: DVB-T any type. Second image with signing speaker is inserted over the conventional image as a picture-in picture (PiP) created in the video mixer by means of a secondary input. The small window of signing image can be standard definition or maybe less.

2) Broadcasting is DTT, compliant with DVB.

3) Production is by means of a second small studio with monitoring of main program.

c) Pilot of IP Subtitling

Month 8/10-20/22

- Study of operational models and practices on subtitling for TV. Formats of subtitles and delivery to diverse platforms.
- Identification of services needing subtitles delivery through Internet Protocol (IP), IPTV, and other on line services.
- Study of emerging services platforms & technologies subtitling capabilities.
- Proof of concept over Personal Computer (PC) displays of services. TV sets

Month 21/23-30

- Recommendations contribution draft
- Evaluation trial
 - Planning
 - Evaluation
 - Conclusions
- User evaluation

Month 25 -30

- Final recommendation contribution

About the technology to be used in IP subtitling pilot:

1) Receiver: It can be PCs and DVB player applications. Also it can be Set-Top-Box (STB) with IP input and also Wi-Fi connected to a domestic gateway.

2) Distribution: The DVB-T stream in format Asynchronous Serial Interface (ASI) (188 Bytes packets) is sent to a gateway (all the multiplex in an early stage, separated channels later). The stream contains the associated services, as subtitles, that can be decoded optionally by the receiving end. The gateway generates the multicast IP protocol in a restricted access network of IP TV platforms.

3) Production. The subtitle files are originated in the same circuit as in terrestrial analog TV and DTT. There are a system that converts *.sbt subtitle files to subtitle graphics according to DVB ETSI EN 300 743 for DTT. The PES (packet elementary stream) is sent to the DVB flow-server that generates Service Information and multiplexes the additional contents, as teletex graphics with the main services. The DBV output of the multiplex stream generator is sent to the IP gateway (the described technology has been developed, implemented and tested in real conditions by TVC)

Another technological side of the tests where TVC is interested in finding a solution is to give optional subtitling to the videos on demand TVC is offering on the open internet and in pay services in low and medium bit rate. These videos are Widows Media and video Flash.

It is important to note that TVC's contact with sensory impaired users is through their associations in Catalonia: *Federació de Sords de Catalunya* (FESOCA), *Federación de Asociaciones de Implantados Cocleares de España* (AICE), *Asociación de Padres de Niños Sordos de Cataluña* (APANSE), the *Federació d'Associacions Catalanes de Pares i Persones Sordes* (ACAPPS), Difusord, and in the case of visually limited people, Spanish National Organisation for the Blind (ONCE) and Catalan Certification Agency (ACC). (in the mailing lists are added a number of distinguished correspondents or "activists" of the sector who often send TVC questions, specific demands and observations about the services and who are interlocutors in most cases) TVC is invited to meetings of the associations and are very present in their social communications. FESOCA, a federation of hearing impaired people has 140,000 members registered. ONCE has a similar number of members. TVC has received multiple awards from these organisations. In this way TVC reaches the majority of access service users who receive weekly news from TVC about what programs provide access services. TVC receives continuously their opinions and demands. TVC has processed questionnaires from access service users several times in the past. TVC is confident it can launch a series of questionnaires according to the needs of DTV4All and that the response from its access service users will be very collaborative given that access service users collectives are very active and responsive (and demanding!) in Catalonia.

For the pilots run TVC, the main mature access service pilot activities are summarised in Table 4.

Table 1: Germany – RBB Pilot – Mature Services			
1. What sort of testing of mature services done so far None			
2. Motivation in the project - relevant legislation/policy/ corporate social responsibility / exchange of practice etc. As a public service broadcaster RBB has a duty to provide its audiences with barrier free access to all its productions.			
3. Lead person responsible for the pilot: Administration: Bettina Heidkamp, Technical Details: Sven Glaser			
Main pilot phases – DVB Subtitles/Clean Audio	Time-frame	Supporting partners/organisations/subcontracting (specify what tasks) /if users – how many impacted and how many actively involved; profile (disabilities, age etc.)/	Adjustments needed in relation to current service provision (technical and organisational)
4. <i>A political or regulatory go-ahead for the introduction of a new, mature access service</i> So far Germany has no legislation requiring subtitling; however it is foreseeable that some sort of legislation regarding access services could come either at a national or a European level. A recent European Parliament declaration, for example, calls on the Commission to put forward a legislative proposal requiring public-service television broadcasters in the EU to subtitle all of their programmes. It is therefore important that RBB as a public service broadcaster investigates the future of access services via DVB.	2008-2010		
5. <i>The overall planning of a new, mature service</i> Introduction of DVB subtitles and clean audio is being planned and executed together with DVB System Planning Department of the ARD Play Out Center at RBB and with the two teletext production teams of RBB and ARD..	Month 3 until month 7 of the project.	DVB Playout Center Teletext production team of RBB and of ARD	
6. <i>Consultations and testing of the features of the new service with stakeholders.</i> These include the intended audience (in this case the relevant associations in Berlin-Brandenburg for deaf, hard of hearing both for subtitling and clean audio), hardware manufacturerers and suppliers of both broadcast equipment and end user side equipment (e.g. STB manufacturerers)	Month 4 until month 18. Pilot tests from month 8	DVB Playout Center Teletext production teams	

Table 1: Germany – RBB Pilot – Mature Services (continued)

<p>7. <i>Detailed planning of the new, mature service.</i></p>	<p>Month 4 until month 7 of the project</p>		
<ul style="list-style-type: none"> - Concrete targets for the content category for which subtitling and clean audio is to be provided. 		<p>Teletext production teams</p>	
<ul style="list-style-type: none"> - A specification of the number of hours or the percentage of output for which subtitling and clean audio has to be produced (including a breakdown of the number of hours of new content, repeats etc) in conformity with points 1 and 3. 		<p>Teletext production teams</p>	
<ul style="list-style-type: none"> - Costing of the production (typically the cost per minute or cost per programme to create the subtitles and clean audio signal) 		<p>DVB Play Out Center Teletext production teams</p>	
<ul style="list-style-type: none"> - Testing the required technology and deciding in favour of a solution 		<p>DVB Play Out Center</p>	
<ul style="list-style-type: none"> - Testing suitable Set-Top-Boxes and choosing final test device 		<p>DVB Play Out Center</p>	
<ul style="list-style-type: none"> - Analysis of changes needed in the production and transmission work-flows and infrastructure leading to cost of production and transmission changes 		<p>DVB Play Out Center</p>	
<p>8. <i>Test production and validation of the new service.</i></p>			
<ul style="list-style-type: none"> - Integrating the new technology (DVB-transcoder module) into given production environment 		<p>DVB-Play Out Center</p>	<p>Given the results of the tests, new technology needs to be purchased (transcoder/ DVB subtitling module) and integrated into given production and play out environment</p>
<ul style="list-style-type: none"> - Production of the subtitles, implementing and validating changes in production and transmission. In this case the scope is restricted to digital terrestrial television with the option of expanding this to include digital satellite and digital cable at a later stage. 	<p>Month 8 until month 18 of the project</p>	<p>DVB Play Out Center And Teletext production teams</p>	
<ul style="list-style-type: none"> - Validation of subtitles: Validation of user friendliness of appearance, weekly changed parameters (size, background, fonts etc.) 	<p>Month 8 of the project</p>	<p>Involvement of test user groups. During the pilot tests will be conducted with</p>	

		50 users (25 hard of hearing, 25 deaf)	
<ul style="list-style-type: none"> - Production of clean audio. If it is decided to actually play out clean audio as a second audio track, this will also be restricted to DVB-T broadcast. First, clean audio will be tested by RBB in laboratory tests (WP3). In parallel, the requirements for play out via DVB-T will be constituted and the feasibility for such a test will be estimated. An alternative problem free variant could be to provide hard of hearing test persons from the DVB subtitle user group with a respective DVD with a large number of audio samples. This would also offer the possibility of testing more different variations of clean audio production than in live play out. 	Month 17 of the project		Set-up of a second audio track Data rate may need to be adjusted Digital signal processing equipment needed.
<ul style="list-style-type: none"> - Validation of clean audio 		Involvement of test user groups (about 25 hard of hearing users from the 50 person pilot), IRT and, if actual play out will take place, DVB Play Out Center	
<p>9. <i>The new service enters operation.</i> This may well be a so-called soft launch where the service is operational but not widely publicised so that adjustments can be made to production and transmission. In RBB's case point 8 above covers this step (in case of the DVB-subtitles – in order to validate the subtitles they are broadcast via DVB-T to all 1,5 reception devices in the region. However, only the 50 testers will be informed at this early stage. Continuous operation and final official launch of DVB-subtitles will to a great extent depend on the results of the user validation and the technological validation.</p>	Month 8 of the project	DVB Play Out Center Teletext production teams	
<p>10. End of pilot/</p>	Month 18 of the project		
<p>11. <i>The service and technological disruption.</i> No technological disruption foreseen for RBB as long as analogue teletext subtitles continue to be produced, as these will be transformed by chosen transcoder technology into DVB subtitles.</p>		DVB Play Out Center	

Table 1: Germany – RBB Pilot – Mature Services (continued)

<p>12. <i>Phasing out a given service on one platform in favour of another.</i> Subtitling in Germany is currently offered via teletext (both on analogue and digital TV), DVB-subtitling is not yet available in RBB's and ARD's service. Given the pilot of DVB-subtitles is successful it is planned to keep up DVB subtitles in parallel to analogue teletext subtitles. Following the planned digital switch-over in 2012, analogue teletext will eventually be replaced.</p>			
<p>13. Post piloting tasks/analyses to be done/ Following the end of the pilot phase a comprehensive analysis needs to be provided for:</p> <ul style="list-style-type: none"> o The production costs for both subtitling and clean audio production o Any changes in workflow resulting from the production of the services o Reliability of service o Acceptance and usability of service by test users and suggested improvements <p>This information will be used to provide a roadmap for the possible introduction of the services on a regular basis.</p>		<p>DVB Playout Center Teletext production teams</p>	
<p>Horizontal issues</p>			
<p>A. What technology</p>	<p>DVB Subtitling EN300743v1.2.1 and DVB Audio</p>		
<p>B. What devices normally users are expected to have? Is it a desired functionality?</p>	<p>Standard DVB-T receiver</p>		
<p>C. Content to be used/deployed</p>	<p>Subtitles produced at RBB</p>		
	<p>Risks</p>	<p>Mitigation</p>	
<p>D. Main technical risks:</p>	<p>Individual STB may not fully support standard DVB subtitles</p>	<p>If this is the case for users in the pilot, then they shall have to be equipped with a DVB subtitled enabled STB.</p>	
	<p>Restricted bandwidth for clean audio</p>	<p>Balancing of bandwidth for video and clean audio signal.</p>	
	<p>Time delay for both clean audio and DVB subtitling due to processing time required</p>	<p>This is an issue for emerging services, e.g. video delay on the receiver side.</p>	
<p>E. Other Risks:</p>	<p>Due to differing presentation in analogue and digital subtitling, the screen display may not be optimal in DVBS, e.g. line breaks at different positions</p>	<p>Automatic line break adjustment by subtitle transformation module. This could also be a receiver side issue for emerging services.</p>	

Table 2: Denmark – DR Pilot – Mature Signing Services			
1. Short description of current situation – services provided, technology, outreach DR currently offers signing for those with hearing impairments on weekdays between 17:00 and 19:00 on weekdays and at other times at the weekend. The service is offered with the late afternoon news and current affairs programmes on DR1, DR2 and TV2 (19:00-19:25) in a virtual channel in mux 1 (requiring statistical multiplexing to free up bandwidth – see Figure 2). As the number of programmes increases, there may well be capacity issues. By 2012, the solution will no longer be viable due to the prevalence of HD and the lack of bandwidth for a virtual channel of this kind.			
2. What sort of testing of mature services done so far Testing originally involved a separate picture in picture solution where the quarter screen signal was added to the conventional channel (originally an MHP application conceived in collaboration with RBB in 2002). This solution had a number of technical disadvantages. New tests, with a user panel of persons with hearing disabilities selected by the Danish Association for the Deaf lead to a decision to adopt an alternative solution in which the deaf signer stands in front of a panel display showing the channel (picture in picture the other way round). This solution enjoyed greater support than any of the other solutions tested.			
3. Motivation in the project - relevant legislation/policy/ corporate social responsibility / exchange of practice etc. / A mix of public service obligations and regulatory requirements through the public service contract.			
4. Lead person responsible for the pilot: Technical: Peter Mølsted editorial: Peter Olaf Looms			
Main pilot phases – Mature Signing Services	Time-frame	Supporting partners/organisations/subcontracting (specify what tasks) Testing was originally conducted with a panel of users selected by the Danish Association for the Deaf (approx. 30 households).	Adjustments needed in relation to current service provision (technical and organisational)
1. <i>A political or regulatory go-ahead for the introduction of a new, mature access service in a territory where this has not yet been introduced. In the case of signing for those with hearing impairments, discussions were conducted as part of revision of the broadcasting act and the ministerial orders (including the public service broadcasting agreement) governing the period from 2003-2006. Proof of concept with alternative solutions in consultation with RBB.</i>	2002-2006		
2. <i>The overall planning of a new, mature service (eg. Signing on DTT) that was introduced in Denmark on 31 March 2006). The planning was carried out by the executive commissioner and the distribution department at DR</i>	2005-31 March 2006)		

Table 2: Denmark – DR Pilot – Mature Signing Services (continued)

<p>3. <i>Consultations and testing of the features of the new service with stakeholders.</i> These include the intended audience (in this case with the Danish Association for the Deaf, the regulator, the Danish Ministry of Culture, and the platform operator (BSD, Broadcast Services Denmark). The executive commissioner for access services and the person responsible for the technical design and implementation take part in regular meetings.</p>	<p>2005-31 March 2006)</p>		
<p>4. <i>Detailed planning of the new, mature service.</i> This includes /any concrete figures or targets at this point?/</p>			
<ul style="list-style-type: none"> - Concrete targets for the content category for which DEAF SIGNING is to be provided (in this case, high-end television drama) in conformity with points 1 and 3. 		<p>550 hours of live transmissions in 2008 (news and current affairs) A reduced number of repeat broadcasts (approx. 150 hours/annum)</p>	
<ul style="list-style-type: none"> - A specification of the number of hours or the percentage of output for which DEAF SIGNING has to be produced (including a breakdown of the number of hours of new content, repeats etc) in conformity with points 1 and 3. 		<p>See 4a.</p>	
<ul style="list-style-type: none"> - Costing of the production (typically the cost per minute or cost per programme to create the DEAF SIGNING files) 		<p>To be supplied.</p>	
<ul style="list-style-type: none"> - Analysis of changes needed in the production and transmission work-flows and infrastructure leading to costing of production and transmission changes 		<p>Completed.</p>	
<p>5. <i>Test production and validation of the new service.</i> Production of the DEAF SIGNING in Denmark has been operational since 31 March 2006..</p>			
<p>6. <i>The new service enters operation.</i> In the case of DEAF SIGNING, this may well be a so-called soft launch where the service is operational but not widely publicised so that adjustments can be made to production and transmission.</p>	<p>Jan-March 2006</p>		
<p>7. <i>The new service is scaled up to its final target level.</i> In the case of DEAF SIGNING, the level at which targets for DEAF SIGNING will be subject to a new round of consultations with the regulator and the Danish Association for the Deaf in the course of the next 12-18 months. The final targets will require consensus on the part of all relevant stakeholders in order to reach agreement on a sustainable solution.</p>			
<p>8. /End of pilot?/</p>	<p>March 2006</p>		

Table 2: Denmark – DR Pilot – Mature Signing Services (continued)

<p>9. <i>The service and technological disruption.</i> In the case of DEAF SIGNING, we already anticipate the need to consider new solutions to delivering DEAF SIGNING to those with visual impairments by 2012. DR initiates activities in mux 2 (MPEG-4) in the next two years. Mux 1 is to be converted to MPEG for in 2012. At that point, there will be bandwidth constraints requiring either a conventional picture-in-picture solution or some other solution that does not require an additional HD stream in an MPEG-4 mux.</p>	<p>Deadlines in 2010, 2012</p>	<p>A consensus on an alternative to the existing MPEG-2 based virtual channel needs to be reached in the course of 2009 for inclusion in the next public service contract running from 2011 onwards.</p>	
<p>10. <i>Phasing out a given service on one platform in favour of another.</i></p>	<p>Mux 1 switches from MPEG-2 to MPEG-4 in 2012.</p>		
<p>11. /Post piloting tasks/analyses to be done/</p>			
<p>Horisontal issues</p>			
<p>A. What technology</p>	<p>Currently DVB-T uses DVB-SI to produce both a conventional channel (no signing) and a low-bit-rate virtual channel with signing of less than 3 mbit/sec. This approach is not scaleable and needs replacing within the next 2-4 years.</p>		
<p>B. What devices normally users are expected to have? Is it a desired functionality?</p>	<p>Currently runs on ALL DVB-T receivers without exception.</p>		
<p>C. Content to be used/deployed</p>	<p>News and current affairs.</p>		
	<p>Risks</p>	<p>Mitigation</p>	
<p>D. Main technical risks:</p>	<p>Lack of widespread, open-standard API in use both on standard definition and high definition.</p>	<p>Proactive engagement in standardisation bodies such as EBU Technical Committee, DVB and NORDIG to identify solutions as early as possible and to work towards an open API with no IPR baggage to assure interoperability.</p>	
<p>E. Other Risks:</p>	<p>Backlash from those using current system who perceive the changes to be a deterioration in the service offered.</p>	<p>Testing to assure high user acceptance; close collaboration with the various disability groups to provide timely information about the transition from the current to a new signing solution in Mux 1.</p>	

Table 3: Denmark – DR Pilot – Mature Services – Audio Description
<p>1. Short description of current situation – services provided, technology, outreach Audio Description (broadcaster mix) is currently being launched in Denmark in compliance with the public service contract with the ministry of Culture (regulator) The initial offering is high-end drama in Danish. Following an evaluation of the pilot in 2008, DR is to publish a plan for regular transmission of Audio Description acceptable to the regulator. This will include targets in terms of content categories and the number of hours of new content and repeats that is to be broadcast each year.</p>
<p>2. What sort of testing of mature services done so far. The solution chosen has been agreed with <i>Dansk Blindesamfund</i> -The Danish Association of the Blind. Systematic feedback from audiences has been planned.</p>
<p>3. Motivation in the project - relevant legislation/policy/ corporate social responsibility / exchange of practice etc. The provision of AD is stipulated in the Public Service contract.</p>
<p>4. Lead person responsible for the pilot Technical: Peter Mølsted Editorial: Peter Olaf Looms</p>

Table 3: Denmark – DR Pilot – Mature Services – Audio Description (continued)

<p>Main pilot phases – Audio Description</p>	<p>Time-frame</p>	<p>Supporting partners/organisations/subcontracting (specify what tasks) There are thought to be approx. 3,500 Danes who are blind. In addition, approx. 1% (50,000) has some kind of serious visual impairment. In addition to these, there are other user groups who are likely to choose AD to enhance their understanding of the visual aspects of television programming. The number of users taking part in tests is normally determined in collaboration with <i>Dansk Blindesamfund</i>.</p>	<p>Adjustments needed in relation to current service provision (technical and organisational)</p>
<p>1. <i>A political or regulatory go-ahead for the introduction of a new, mature access service in a territory where this has not yet been introduced (in the case of Audio Description (broadcaster mix) in Denmark, discussions were conducted as part of revision of the broadcasting act and the ministerial orders (including the public service broadcasting agreement) governing the period from 2007-2010.</i></p>	<p>2007-2010</p>		
<p>2. <i>The overall planning of a new, mature service (eg. Audio Description [broadcaster mix] that is being introduced in Denmark in the course of 2008). The planning is carried out by the executive commissioner and the distribution department at DR. The pilot consists of two separate components cf. Horizontal issues on next page.</i></p>	<p>Month 1-2 of the project</p>		<p>Major adjustments of archives, production and contribution infrastructure to handle additional audio channels. Changes to play-out procedures.</p>

Table 3: Denmark – DR Pilot – Mature Services – Audio Description (continued)

<p>3. <i>Consultations and testing of the features of the new service with stakeholders.</i> These include the intended audience (in this case with <i>Dansk Blindesamfund</i> -The Danish Association of the Blind, the regulator, the Danish Ministry of Culture, and the platform operator (BSD, Broadcast Services Denmark). The executive commissioner for access services and the person responsible for the technical design and implementation take part in regular meetings including a visit to the BBC to see how this is handled in practice. It is often possible to discuss how a mature service needs to be offered in relation to examples of such services elsewhere. In the case of AD in Denmark it was possible to use the BBC AD services as a common point of reference. <i>Dansk Blindesamfund</i> and the other stakeholders were able to agree to the features of the service on this basis.</p>	<p>Month 3-6 of the project</p>	<p><i>Dansk Blindesamfund</i> -The Danish Association of the Blind The Danish Ministry of Culture BSD, Broadcast Services Denmark (mux 1-2) Boxer (mux 3-6)</p>	<p>On March 29, 2008 a new DTT gatekeeper (Boxer) was selected by the Ministry of Culture to operate mux 3-6. This will require additional consultations to coordinate the infrastructure required to handle access services.</p>
<p>4. <i>Detailed planning of the new, mature service.</i> This includes /any concrete figures or targets at this point?/</p>			
<p>- Concrete targets for the content category for which AD is to be provided (in this case, high-end television drama) in conformity with points 1 and 3.</p>		<p>2008: A minimum of 10 hours of AD for high-end Danish drama per annum plus one repeat per episode (min. 20 hours per annum). Transmission of AD produced for 5-10 hours of Danish films. 2009 onwards: targets subject to negotiation with regulator, but at least same level as 2008, and likely to increase.</p>	
<p>- A specification of the number of hours or the percentage of output for which AD has to be produced (including a breakdown of the number of hours of new content, repeats etc) in conformity with points 1 and 3.</p>		<p>DR in 2008. min. 10 hours new AD min. 10 hours repeats</p>	
<p>- Costing of the production (typically the cost per minute or cost per programme to create the AD files)</p>			

Table 3: Denmark – DR Pilot – Mature Services – Audio Description (continued)

<p>- Analysis of changes needed in the production and transmission work-flows and infrastructure leading to costing of production and transmission changes</p>		<p>Two alternatives being evaluated (cf. horizontal issues)</p>	
<p>5. <i>Test production and validation of the new service.</i> Production of the AD files, implementing and validating changes in production and transmission. In this case the scope is restricted to digital terrestrial television with the option of expanding this to include digital satellite and digital cable at a later stage. In the case of AD in Denmark, this has been going on since November 2007.</p>		<p>Technical issues for DVB-C (TDC/You See and Telia/Stofa) already identified and being addressed. DVB-S is not currently required to offer AD; IPTV suppliers currently not able to handle retransmitted AD streams and metadata. Regulatory no-man's land,</p>	
<p>6. <i>The new service enters operation.</i> In the case of AD, this may well be a so-called soft launch where the service is operational but not widely publicised so that adjustments can be made to production and transmission.</p>		<p>Soft launch carried out in March 2008.</p>	
<p>7. <i>The new service is scaled up to its final target level.</i> In the case of AD, the level at which targets for AD (broadcast mix) will be subject to a new round of consultations with the regulator and <i>Dansk Blindesamfund</i> in the course of the next 12-18 months. The final targets will require consensus on the part of all relevant stakeholders in order to reach agreement on a sustainable solution.</p>			
<p>8. /End of AD pilot?/</p>		<p>December 2008</p>	
<p>9. <i>The service and technological disruption.</i> In the case of AD, we already anticipate the need to consider new solutions to delivering AD to those with visual impairments in the 4-10 year time frame, as high definition broadcasting is likely to become widespread on most digital television platforms (other than DVB-H) from 2012 onwards. At that point, there will be bandwidth constraints for moving from stereo to some kind of multi-channel audio solution. It is likely that the bandwidth requirements for multi-channel audio will be greater than the stereo solution that it will complement and finally replace. In turn, this will provide the impetus to assess the introduction of AD (receiver mix) where the audio description is decoded separately in the digital television receiver /set top box, allowing the user to determine the mix between the original audio and the AD channel and also its spatial positioning.</p>		<p>Work will need to begin by the end of 2009 in order to agree on standards for receiver mix</p>	

Table 3: Denmark – DR Pilot – Mature Services – Audio Description (continued)

<p>10. <i>Phasing out a given service on one platform in favour of another.</i> AD (Broadcaster mix) on DTT will need to be phased before HD is generally available on DTT sometime before 2012. There are also related, secondary issues such as Personal digital Recorders and their ability to record and allow for the re-use of AD associated with a given programme.</p>		
<p>11. <i>Post piloting tasks/analyses to be done/ Working with the EBU, guidelines have to be drafted and inputs for standardisation bodies such as DVB drawn up based on an analysis of experience gained during the pilots.</i></p>		
<p>Horizontal issues</p>		
<p>A. What technology</p>	<p>AD in this case is Broadcaster Mix (initially a complete remixed stereo channel containing the AD in addition to the conventional stereo channel without AD already available). Two variants will be tested: - AD defined as a virtual channel (same video + AD stereo mix) - AD defined as alternative audio channel (same video but with choice of two stereo mixes). AD is delivered on DVB-T on the Danish digital terrestrial television transmission infrastructure for mux 1 and 2.</p>	
<p>B. What devices normally users are expected to have? Is it a desired functionality?</p>	<p>The user of the AD service is expected to have a DVB-T receiver that complies with NORDIG and DVB standards. In principle, all receivers in the market should be compliant, but as there is no mandatory testing for NORDIG compliance, a small proportion of DVB-T receivers may not function correctly. Alternatively, the user of the AD service is expected to have a DVB-C receiver that complies with NORDIG and DVB standards.</p>	
<p>C. Content to be used/deployed</p>	<p>Initially high-end Danish drama.</p>	
	<p>Risks</p>	<p>Mitigation</p>
<p>D. Main technical risks:</p>	<p>DVB-T receivers that have not correctly implemented said NORDIG and DVB standards (cf. "A. What technology")</p>	<p>Collaboration with Dansk Blindesamfund and DigiTV to produce a positive list/negative list of receivers</p>
<p>E. Other Risks:</p>	<p>(i) New gatekeeper on DTT mux 3-6. (ii) Redistribution on DVB-C</p>	<p>(i) Proactive contacts with Boxer to agree on open standards and interoperability. (ii) Some digital cable and SMATV systems do not handle AD (broadcaster mix) correctly. Proactive contacts with TDC/You See and Telia/Stofa Additional information on www.digitv.dk and www.dr.dk (FAQs for access services for digital television)</p>
<p>/Incorporate the matrix mentioned on page 9/</p>		

Table 4: Spain Catalonia – TVC Pilot – Mature Services			
1. Short description of current situation – services provided, technology, outreach Subtitling services over teletext services are being provided. The extension of these services to DTT broadcasts is in an advanced stage. AD is in an experimental stage			
2. What sort of testing of mature services done so far None in a formal methodical way but contact with the relevant associations is intense to be sure of reach to users to their satisfaction			
3. Motivation in the project - relevant legislation/policy/ corporate social responsibility / exchange of practice etc. There is strong demand from users			
4. Lead person responsible for the pilot. At the moment Pere Fàbregas (needs to be appropriate for the technical direction of the work)			
Main pilot phases – a)DVB Audio Description b)Signing	Time-frame	Supporting partners/organisations/subcontracting (specify what tasks)	Adjustments needed in relation to current service provision (technical and organisational)
1. <i>A political or regulatory go-ahead for the introduction of a new, mature access service</i> So far Spain has no legislation requiring subtitling; however it is foreseeable that some sort of legislation regarding access services could come either at a national or a European level	2008-2010		
2. <i>The overall planning of a new, mature service</i> Pilot about Audio description <i>Month 25-30</i> <ul style="list-style-type: none"> • Benchmarking and best practices • Recommendations for new services 	Month 1 of the project to 30	People with sensory limitations are associated enough to have a voice and intense contact with TVC accessibility services.	
3. <i>Pilot about Audiodescription</i> <ul style="list-style-type: none"> • Pilot of mature services planning, implementation • Evaluation • Benchmarking and best practices • Recommendations for mature services • Emerging services <ul style="list-style-type: none"> ○ On line delivery technological proof of concept ○ DTT user mixing 	Month 8/10-20/22		

Table 4: Spain Catalonia – TVC Pilot – Mature Services (continued)

<p><i>Pilot about Audiodescription</i></p> <ul style="list-style-type: none"> • Benchmarking and best practices • Recommendations of mature services • On line delivery trial <ul style="list-style-type: none"> ○ Planning trial ○ Evaluation plan ○ Trial ○ Evaluation • DTT user mix evaluation (depending on Decoders availability) 	<p>Month 22/24</p>		
<p>4. <i>Pilot about Audiodescription</i></p> <ul style="list-style-type: none"> • Final recommendation contribution 	<p>Month 25 - 30</p>		
<p>5. <i>Consultations and testing of the features of the new service with stakeholders.</i> These include the intended audience (in this case the relevant associations Catalonia and Spain for deaf, hard of hearing for subtitling and blind and visually impaired for clean audio, see page 36)</p>			
<p>6. b) <i>Detailed planning of the new, mature services</i></p> <p>Signing</p> <ul style="list-style-type: none"> • Identification of suitable services for signing delivery. • Identification of types of services. Over DTT, over IP. Combinations. Work flow models for signing. Forms of production of signing video-signal. Direct, delayed... • Available delivery technologies DTT, IP.... Proofs of concept over computer displays and tv-sets. Picture in picture DTT capabilities. • Bitrate compromise on independent TV channel. 	<p>Month 8/10-20/22</p>		
<p>Signing</p> <ul style="list-style-type: none"> • Recommendations contribution draft • Evaluation trial <ul style="list-style-type: none"> ○ Planification ○ Evaluation of the pilot services by the intended audience • Conclusions 	<p>Month 21/23-30</p>		

Table 4: Spain Catalonia – TVC Pilot – Mature Services (continued)

Signing			
• Final recommendation contribution	Month 25-30		
a. A specification of the number of hours or the percentage of output for which subtitling and clean audio has to be produced (including a breakdown of the number of hours of new content, repeats etc) in conformity with points 1 and 3.			Increase of subtitled programs. Extension of subtitling in 2 channels Increase in AD films
b. Costing of the production (typically the cost per minute or cost per programme to create the subtitles and clean audio signal)			
c. Analysis of changes needed in the production and transmission work-flows and infrastructure leading to costing of production and transmission changes			
<i>7. Test production and validation of the new service.</i>			
a. Production of the subtitles, implementing and validating changes in production and transmission. In this case the scope is restricted to digital terrestrial	Month 8 of the project	Involvement of test user groups. Technical team control protocol. Preparatory meeting with associations	
b. Production of clean audio. This will also be restricted to DVB-T broadcast.	Month 12	Involvement of test user groups. Quality of service technical and accessibility teams	Set-up of a second audio track in other channel. Improvements in automation.
8. <i>The new service enters operation.</i> This may well be a so-called soft launch where the service is operational but not widely publicised so that adjustments can be made to production and transmission.		DVB Playout Center Teletext production teams	
9. /End of pilot?/	Month 20/22		
10. <i>The service and technological disruption.</i> No technological disruption foreseen for		DVB Playout Center Teletext production teams	

Table 4: Spain Catalonia – TVC Pilot – Mature Services (continued)

<p>11. <i>Phasing out a given service on one platform in favour of another.</i> Subtitling in Catalonia is currently offered via teletext (both on analogue and digital TV), DVB-subtitling is not yet available. Following the digital switch-over in 2012, analogue teletext will eventually be replaced at which stage subtitling will be produced directly for DVB.</p>			
<p>12. /Post piloting tasks/analyses to be done/ Following the end of the pilot phase a comprehensive analysis needs to be provided for:</p> <ul style="list-style-type: none"> o The production costs for both subtitling and clean audio production o Any changes in workflow resulting from the production of the services o Reliability of service o Acceptance and usability of service by test users and suggested improvements <p>This information will be used to provide a roadmap for the possible improvement and ampliation of the services (in quantity and platform, as IPTV)</p>		<p>DVB Playout Center Teletext production teams</p>	
<p>Horizontal issues</p>			
<p>A. What technology</p>	<p>DVB Subtitling ETSI EN 300 743 v1.3.1 and DVB Audio</p>		
<p>B. What devices normally users are expected to have? Is it a desired functionality?</p>	<p>Standard DVB-T receiver</p>		
<p>C. Content to be used/deployed</p>	<p>Subtitles produced by TVC</p>		
	<p>Risks</p>	<p>Mitigation</p>	
<p>D. Main technical risks:</p>	<p>Individual STB may not fully support standard DVB subtitles</p>	<p>If this is the case for users in the pilot, then they shall have to be equipped with a DVB subtitled enabled STB.</p>	
	<p>Restricted bandwidth for clean audio</p>	<p>It is to be discussed and tested. In the current test period TVC are using the dual channel (96 kb BW in mono, DTTT)</p>	
	<p>Time delay for both clean audio and DVB subtitling due to processing time required</p>	<p>There were no special problems in experimental broadcasting.</p>	
<p>E. Other Risks:</p>	<p>Due to differing presentation in analogue and digital subtitling, the screen display may not be optimal in DVBS, e.g. line breaks at different positions</p>	<p>The necessary work in experimental period has been done: Automatic line break adjustment by subtitle transformation module.</p>	

5 Concluding remarks

As the mature access services are already deployed in the target regions, the objective of the mature access services pilots is to accelerate the roll-out of mature access services by evaluating existing access services, and through the provision of implementation guidelines produced as a result of the experience gained in running the pilots which will be targeted at countries where as yet no DVB-T services are deployed and in countries where DVB-T services are deployed which have spare spectrum potentially available for the delivery of access services.

The evaluation methodology underpinning the evaluation of the mature pilot services reported in this deliverable is described in detail in DTV4All project Deliverable D2.2 Evaluation Methodology. This document is best appreciated if read in parallel with D2.2.