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FINAL REPORT

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1. Project description and objectives

1.1 Background

DTV4All Project Proposal was submitted to the European Commission in response to a call (CIP-ICT PSP-2007-1) issued under the Competitiveness and Innovation Framework Programme (CIP) ICT Policy Support Programme published in May 2007, as a Pilot B Project Proposal that was required to perform:

> *Type B pilots aim at a first implementation of an ICT based innovative service addressing the needs of citizens, governments and businesses. The pilots should be carried out under realistic conditions. The emphasis is on fostering innovation in services, consequently the pilot may need to take-up completed R&D work, may extend already tested prototype services or may combine / integrate several partial solutions to realise a new innovative approach. Whichever approach is taken, the outcome of the work shall be an operational pilot service demonstrating significant impact potential. It is considered essential from the outset that the pilot will engage a complete value-chain of stakeholders in the work. The pilot should demonstrate the technical, organisational and legal feasibility of the service and evaluate the impact of these innovative ICT-based solutions in view of their wider deployment and use.*
>
> *Type B pilot projects are expected to implement their service in at least four Member States or associated countries, however, proposers should anticipate sustainability and scalability beyond the pilot phase, when making their proposal.*
>
> *The duration of the pilot is expected to be 24 to 36 months within which there should be a 12 month operational phase. An operational phase is defined as the situation in which the interoperable services and technologies are functioning in a real-life setting.*
>
> ICT PSP Work Programme 2007, Page 34

The objectives of the call for proposals were:

> *The objective is to achieve a significant advancement in accessibility of multi-platform and convergent electronic communications focusing, as a first step, on new digital audio-visual (AV) systems and devices, content and services ahead of large scale rollout of this technology across Europe.*

It is intended to support one pilot action that will focus on the accessibility of Digital TV (DTV) for all, in particular for people with disabilities and older persons. The rollout of DTV along with development of interactive services in Europe will establish a widespread additional channel to new and enhanced content and services, as well as continued access to current range of facilities following digital switchover[1]. This should act as a catalyst for future industrial approaches to inclusion-oriented product and services development.

The aim is also to develop Europe wide specific DTV solutions for accessible program guides, subtitling and audio description, interactivity, accessible equipment, etc.

ICT PSP Work Programme 2007, Pages 17-18

Targeted outcomes and characteristics were:

- *Integrated pilot solutions testing and categorising accessibility implementations for a range of applications and solutions for persons with disability and elder people. These should be replicable in Europe in a sustainable market. The pilot should be based on:*
  - *a set of accessibility specifications in the technological area concerned (i.e. DTV devices, content and services) agreed by key user representatives, device manufacturers, content creators and broadcasters[2]. Accessible DTV is seen as a step towards accessible convergent communications in a technologically neutral environment;*
  - *a set of requirements and specifications for integration of accessibility related services in DTV (e.g. provision of audio descriptions) and related open interfaces, suitable for multi-platform and convergent communications.*
- *The work will include a comprehensive socio-economic evidence base for ICT investments in the field, including cost-benefit analysis, to be shared between Member States or associated countries and other stakeholders.*

[1] Member States have agreed in Council to achieve switch-off of analogue terrestrial broadcasting by 2012, ref. Memo/06/60, 7/2/2006. See also revision of directive on Television Without Frontiers: http://ec.europa.eu/comm/avpolicy/reg/tvwf/index_en.htm

[2] See also CENELEC report on accessible TV for All, http://www.cenelec.org/Cenelec/CENELEC+in+action/Horizontal+areas/ICT/e-Accessibility+and+TV+for+All.htm

- *Proposals must include organisations capable of reaching a sufficient number of users for requirements analysis and pilot testing. The pilot should have involvement from digital TV and AV technology suppliers as well as broadcasters interested in cross-platform interoperability and committed to embed accessibility requirements in mainstream technology development. Strong user involvement is needed as well as involvement of content creators and the public sector. The pilot should demonstrate the technical, organisational and legal feasibility and evaluate the impact.*
- *The pilot projects should produce reference material including guidelines, manuals, and educational materials, and should deliver dissemination actions. This will enable authorities and bodies to implement (or replicate) interoperable solutions.*

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The expected impact was:

- *Wide diffusion and use by all citizens (in particular consumers with visual, hearing or dexterity impairments) of advanced accessible audiovisual systems and devices, content and services. Full mainstreaming of the "design for all" paradigm in these product and service developments.*
- *Achieving an internal market for accessible AV products and a world leading position for European industry and in particular SMEs in new markets for accessible digital AV products and multiplatform accessibility services.*
- *Provision of the basis for ensuring accessibility of future digital AV products and services as well as sustainable business models for industry to stimulate investments.*

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1.2. Project Objectives

Introduction – the rationale of this project

Access needs

"People with disabilities constitute about 15% of the European population and many of them encounter barriers when using ICT products and services. In certain cases, older people can be faced with similar problems. Accessible ICT products and services have now become a priority in Europe, due to the demographic shift: 18% of the European population was aged over 60 in 1990, while this is expected to rise to 30% by 2030."[3]

"Independent user research conducted for OFCOM[4] in the UK in 2006 shows that the demand for access services such as audio description and subtitling is very significant.[5] The review found that 7.5 million people (=12.3% of the population) said that they had used subtitles to watch television, of whom about 6 million (10%) did not have a hearing impairment."

"Results from the case studies found that those who had used audio description regarded it as very helpful in understanding programmes better, and that a significant proportion of respondents who had not used audio description were keen to try it."[6]

There is further information on the nature of the disabilities and the current and forecast size of the problem in reports such as Portlock *et al.* (2006)[7]; CSR Europe[8]; Mellors, W. J. (2006)[9]. Nevertheless, it should be noted that the lack of solid pan-European statistics about the size of the challenge and the extent to which access services are being rolled out constitutes a problem in its own right.

3 Communication From The Commission To The Council, The European Parliament And The European Economic And Social Committee And The Committee Of The Regions eAccessibility [SEC(2005)1095] Brussels, 13.9.2005 COM(2005)425 final.

http://eur-lex.europa.eu/LexUriServ/site/en/com/2005/com2005_0425en01.pdf

4 Independent regulator and competition authority for the UK communication industries (http://www.ofcom.org.uk/)

5 (Television access services review, see http://www.ofcom.org.uk/consult/condocs/accessservs/summary/)

6 DCMS consultation on the Television Without Frontiers (TVWF) Directive

Response from RNIB and RNID http://www.culture.gov.uk/NR/rdonlyres/709879D2-6860-4D62-A3D3-5EC259C24A2E/0/RNIBRNID.doc

7 Portlock, Stephen et al. The future of access to television for blind and partially-sighted people in Europe. RNIB, London, UK. May 2006.

http://www.euroblind.org/fichiersGB/access-TV.html

8 CSR Europe CSR Info – Disability: Facts and Figures.

http://www.csreurope.org/csrinfo/csrdisability/DisabilityFactsandfig

9 Mellors, W. J. (2006)) WGHI - Working Group on Hearing Impairment Statistics on age and disability and in relation to Telecommunications - A significant market http://www.tiresias.org/wghi/stats.htm

Analogue switch-off by 2012 in Europe represents a unique opportunity to improve the access of digital television for those with physical, mental or age-related impairments. With this in mind, the European Commission has opened a call for a pilot project that can facilitate the availability of such services on digital television in Europe.

Meeting access needs in both the short and medium term

Addressing access needs requires action on two fronts:

- *Ensuring the widespread adoption of mature access services for first generation digital television* typically using DVB/MPEG-2. (short-term scaling up in 2008-2010)
- *Identifying, assessing and promoting emerging access services for second generation digital television* offering high definition and multi-channel audio using MPEG-4, IP delivery, or hybrids using DVB and IP delivery (medium-term 2010-2014)

Three of the B2C access services mentioned in the Call, subtitling, signing (a reduced bandwidth channel) and audio description, by means of mixing at the broadcaster's side, from a market perspective can be classified as mature on one or more platforms. There are several "off-the-shelf" solutions. To ensure these services can be replicated, what is needed Europe-wide is clarification of effective and efficient practice, and strategic guidelines for the implementation and running of services.

Signing using conventional picture in picture, see Figure 1 above, and audio description by means of the user selecting the supplementary access service at the receiver is not yet "off-the-shelf" but will approach maturity on one or a number of platforms in the period to 2010. These access services will, however, face disruption as second-generation digital television platforms requiring new cost-effective access service delivery mechanisms enter into operation.

It is interesting to contrast Figure 1 with Figure 2 below which shows a solution that is a virtual channel with something corresponding to picture-in-picture. The Danish Society for the Deaf worked some years ago with DR[10] and chose this solution rather than a conventional picture in picture solution. However, DR is now anticipating bandwidth issues with this solution within the next two years. This situation highlights a number of issues to be addressed by DTV4All.

[10] Danmarks Radio - The national public broadcaster of Denmark (http://www.dr.dk/)

Figure 1: *Screenshot of convential picture in picture signing (Germany)*

Two emerging services mentioned in the Call, spoken command and speech output [talking Electronic Programme Guides (EPGs)], could well become mature in the period 2010-14. Other access services (including picture-in-picture signing and receiver-mix audio description delivered over IP and "clean audio") are also in the "emerging" category. Experience to date of collaboration between broadcasters and EICTA[11] on access services for free-to-air broadcasting suggests that getting new features adopted requires sustained effort on multiple fronts (standardisation efforts to assure interoperability, consultations with stakeholders at European and national level to maintain focus on priorities, regulatory "carrots and sticks"). Work on emerging services thus needs to move quickly in consultation with stakeholders to establish quite early a set of broadly-supported priorities for free-to-air broadcasting on the assumption that Pay-TV operators will adopt the same priorities on their proprietary platforms.

[11] consumer electronics manufacturers' organisation in Europe, recently changed their name to Digital Europe (http://www.digitaleurope.org/)

Figure 2: Screenshot of a virtual channel with something corresponding to picture-in-picture (Denmark).

Technological feasibility is not enough

The scaling up of mature DTV access services as well as the selection and adoption of emerging ones will depend not only on whether they are technically feasible but also on whether consumers find them acceptable, and whether there is a viable business model and a supportive regulatory regime. All three are prerequisites. The issue of users, technology and business models is also highlighted in a recent ISTAG report[12].

[12] ISTAG REPORT. New Business Sectors in Information and Communication Technologies The Content Sector as a case study Final Version September 2007 (instigated by Ms. Vivian Reding)

Users' needs and interests are already being addressed at multiple levels:

- *At European level* there is already a consultative mechanism in place for B2C access services in which EICTA, the EBU[13], European disability organisations and the European Commission are participants. EICTA has tabled a draft specification that is currently being reviewed[14]. Specific actions were discussed at the Council of Ministers meeting in Lisbon in early December, 2007. Two of the partners in this project already take part in this consultative forum as part of the EBU delegation. This is a key strength of this consortium.
- *At national or regional level*, there are also consultative mechanisms in place. Public service broadcasters like the BBC[15], DR, RBB[16] and TVC[17] develop their access services with and for those who have impairments. Qualitative and quantitative user evaluations for mature access services have already been conducted but require collation and analysis in order to provide strategic inputs at European level. Participatory development mechanisms and results constitute a key strength of this project.

Effective and efficient solutions coupled with sustainable business models are vital.

The development of effective and efficient solutions requires inputs from universities and training bodies concerned with the nature of the services themselves. UAB is a recognised authority at European level and brings to the project its extensive network of practitioners in this field.

The development of sustainable business models requires contributions from stakeholders, such as Red Bee, a supplier of access services in several European countries and of metadata for EPGs for more than 1,200 European television channels. Red Bee is uniquely placed to bring to the project a commercial perspective on the market across Europe.

Digital television for all requires consultations with stakeholders throughout the whole value chain and needs to encompass B2B activities such as norms and standards for those producing, exchanging and archiving audio description and subtitles as well as the metadata for driving such services.

[13] European Broadcasting Union – national public broadcasters' union (http://www.ebu.ch/)
14 EICTA Digital TV e-Accessibility requirements. Brussels, 23 July, 2007

[15] British Broadcasting Corporation - national public broadcaster in UK (http://www.bbc.co.uk/)
[16] Rundfunk Berlin-Brandenburg – regional public broadcaster in Germany (http://www.rbb-online.de/)
[17] Televisió de Catalunya – regional public broadcaster in Catalonia, Spain (http://www.tv3.cat/)

The range of digital television market ecologies in Europe

There are a number of market issues requiring further analysis:

- Switch-off of *analogue terrestrial television* has already taken place in three European countries but mainstream Digital Terrestrial TV (DTT) receivers do not yet handle services other than teletext or DVB-subtitling. In some cases, there are receivers on the market that do not support even these services. In other cases, there are spectrum issues related to finding bandwidth for access services in their current forms on the digital television spectrum that will be aggravated as high definition television with its large bandwidth requirements becomes more widespread during the period 2012-15.
- *Digital cable and satellite television* services are also widespread. Here the service provider decides on the technical platform to be used for delivering access services which does not have to follow any standard. Implementation of new access services on these platforms is thus completely different from the standards-based approach of free-to-air broadcasting and will typically require a transition period of at least three years so that the investment in receivers currently in use can be written off. If access services are to be offered on pay TV platforms, services scheduled to come on stream in 2012 will therefore need to be agreed and in place by 2009.
- *The lack of a widely adopted middleware standard*. Interactive digital text and access services using the open API Media Home Platform (MHP) have run into difficulties and have already been phased out by the DTT operators in Finland and Austria to free up bandwidth for other services. MHP and MHEG-5 are open APIs but their penetration in most member states is not sufficient to meet the requirements of access services unless subsidies are made available for the purchase of the necessary equipment by those with impairments. In a fragmented European market with national peculiarities, access services are under pressure. Reducing the level of fragmentation would improve the case for hardware manufacturers to include access features and services into digital television receivers as a matter of course.
- *National legislation and public service contracts* on access services in full compliance with the EC Subsidiarity Principle leads to a fragmentation of the over-the counter digital TV receiver market. Some services can be decoded using mainstream consumer electronics (e.g. DVB-subtitling) whereas others will continue to require specialised receivers needing subsidies to make their production viable. The distinction between mainstream and specialised receivers requires close attention.

- *Consumers of television are demanding convenience and flexibility*. This means that there is a gradual shift away from watching TV while it is broadcast to the Anything, Anytime, Anywhere paradigm, where TV content discovery and use increasingly takes place asynchronously. In the period after 2010, this has implications for access services on receivers and recorders.

Offering a full range of access services on digital television in Europe is thus not just an issue of agreeing a specification for a Digital TV receiver and ramping up existing activities but looking carefully into the most cost-effective solutions that match the culture and context of a given digital TV platform in the country or territory in question.

The scope of the Pilot

The consortium behind this project believes that the pilot 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[18], 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 DVB-subtitles in different variants for the 12 months pilot. This service will be tested by a representative user group of about 50 users from the respective regional disability organisations already closely co-operating with RBB.
- Identification of emerging services followed by analysis of the identified services and proof-of-concept tests of some of them with feedback from expert viewers and/or focus groups leading to recommendations for emerging services, as well as to guidelines for devices and platforms of second-generation digital television. In this way diffusion will be supported and new access services can become widespread and sustainable.

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).

[18] (offered on a permanent basis from 2009)

Aims and objectives

This project (*DigitalTV4All*) aims to:

1. Offer and evaluate mature subtitling, audio description, audio subtitling and signing services in a minimum of four territories within the EU for at least 12 months
2. 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.
3. Identify and prioritise key emerging access services, and the devices and platforms needed to support them for the period 2010-2012 that are technologically feasible, that have perceived value to their intended users and for which there is a viable business model.
4. Make recommendations regarding mature and emerging access services to EICTA, EBU, NEM[19] 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 are:

A. *A detailed workplan* (D1.1) *for the full-scale deployment of mature access services* for Digital TV in four territories of the EU 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.

[19] European technology platform (for EU FP7 research and development) - European Technology Platform where New Media Content and Networks meet (http://nem-initiative.org/)

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 AD in Denmark it was possible to use the BBC AD 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
    - 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.
    - 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.
    - Costing of the production (typically the cost per minute or cost per programme to create the AD files)
    - Analysis of changes needed in the production and transmission work-flows and infrastructure leading to costing of production and transmission changes
5. *Test production and validation of the new service*. 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.
6. *The new service enters operation.* 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.

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 AD, the level at which targets for AD (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 AD, we already anticipate the need to consider new solutions for delivering AD 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 DVB-H) from 2012 onwards. At that point, there will be bandwidth constraints arising from a move 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 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 decoders are not found in high definition receivers and set-top boxes so a distribution strategy has to be agreed for each territory governing the hand-over from one technical solution to another. 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 subsection B3.2 Work Plan, below. 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 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 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* (D3.6) containing medium-term recommendations on emerging access services that merit wider adoption in Europe and the devices and platforms needed to support them.
D. *A report* (D4.4) containing descriptions of the mature access services, guidelines for their implementation throughout Europe and recommendations (D4.5) regarding emerging access services for which there is widespread industry support that address:

- *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 DVB-SI, DVB-GBS and related standards.
- *Content*: Guidelines for the provision of subtitling, audio description and signing for various content categories on digital television
- *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; B2B and 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
- *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.

E. *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, EBU, NEM initiative and the committees behind international conferences. (D4.2, D4.3, D4.6)

1.3. EU Dimension

The project tackles several barriers that a growing proportion of the population is facing in digital television and as such its impact can hardly be overstated. Indeed, DTV4All addresses many of the action points put forward by the "TV for All" report[20] that was produced by CEN/CENELEC from a mandate by the Commission[21] and developed in collaboration with all relevant stakeholders, including the Commission, ETSI[22]/CEN/CENELEC, user and consumer representatives, service providers and broadcasters and equipment manufacturers. Parallel to this, the EBU established the Project Group P/AS which published a comprehensive report on access services in Europe giving recommendations to the stakeholders. A publication on P/AS is available through EBU[23].

The direct result of DTV4All will be that more content and services in digital interactive broadcasting will be accessible to an ever widening group of European citizens, thereby contributing directly to EU objectives in eInclusion as stipulated in the eEurope 2005 Action Plan as well as in the Framework Directive[24] and the Universal Service Directive[25].

Currently the deployment of access services is fragmented within the EU. In order to convince EICTA of the need for standardised device solutions, large field trials of common access service solutions are essential. In order to substantially improve the overall situation, support from the European Commission will play an essential role in overcoming the related constraints.

The deliverables of the pilot will be fed into existing consultative mechanisms at the European, national and regional level

- At the European level, the deliverables will provide the European Commission with tangible information for use in the existing EICTA/EBU/European disability association forum that is working on access issues in digital television.
- The EBU is a self-funding associate of the project that has mechanisms for promoting technical and service standardisation, interoperability and dissemination of actions aimed at achieving widespread consensus about access services in digital television.

[20] http://www.cenelec.org
[21] "Mandate to the European Standards Bodies for Standardisation in the field of information and communications technologies (ICT) for disabled and elderly people", M/273.
[22] European Telecommunications Standards Institute (http://www.etsi.org/WebSite/homepage.aspx)
[23] http://www.ebu.ch/en/technical/trev/trev_300-de_jong.pdf?display=EN
[24] The Framework Directive 2002/21/EC
[25] The Universal Service Directive 2002/22/EC.

- The existing consultation mechanisms that have been used by the partners to develop, validate, and offer access services in DK, DE, ES and IT will be used to expand the body of good practice on which national initiatives are based without compromising the principle of subsidiarity.
- The criteria for success of the project are based on recent EC studies on the digital content industry referenced below.
- Users from different EU countries will be surveyed for their views on the reception and quality of the accessible content provided. Results from all the project tasks will contribute to the project obtaining all the data needed to draft a good practice report which will, for the first time, take into consideration the entire value chain: its users, the broadcasters and the available or emerging technologies.

1.4. Rationale for EU Funding

National legislation and public service contracts on access services in full compliance with the EC Subsidiarity Principle lead to a fragmentation of the over-the-counter digital TV receiver market. Some services can be decoded using mainstream consumer electronics (e.g. DVB-subtitling) whereas others continue to require specialised receivers needing subsidies to make their production viable.

The broadcasters in the consortium already spend tens of millions of Euros on access services to meet national requirements and voluntary obligations. Collectively these partners have considerable documented expertise in the development, implementation, evaluation and running of mature access services which now by recourse to Commission funding can be collated. The collated data will be fed into standardisation and dissemination actions through existing pan-European bodies to accelerate the take-up of such services across Europe, in particular, by enabling the development of a pan-European market for specialised receivers for access services which will reduce the need to subside their production.

The large-scale pilots enabled by Commission funding 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.

Given the challenges facing broadcasters and platform operators as a result of the emergence of so-called second-generation digital television, the viability of some mature accessibility services is threatened. Currently, a large number of broadcasters are still reluctant to deploy additional accessibility services because of a lack of standardised and feasible technical solutions. Operators are afraid to invest in technologies which turn out not to have a significant market penetration. Additionally, limited spectrum availability becomes an issue where access services have to compete for bandwidth with other services or TV channels. For those access services requiring high bandwidth that are aimed at a comparatively small target group, non-broadcast means of transmission such as parallel IP-unicast represent feasible and competitive alternatives to terrestrial broadcast. Approaches to countering these threats to and limitations of access services need to be developed at a European level for them to be effective.

Emerging access services that require second-generation devices and platforms for their delivery need systematic assessment so that the results of the assessment can be fed into the strategic planning of medium-term investments in digital television to promote their roll-out. In the current laissez-faire regulatory environment, the take-up of these emerging access services is dependent on a broad consensus on them being achieved at national and European levels. Without Commission funding to support the process of consensus building the take up of the emerging access services is likely to be patchy.

There is no ongoing mechanism for assuring the collaboration of the whole value chain for the provision of access services in digital television. The EBU does provide an infrastructure for doing this, as does the EICTA access services forum that is currently being established. Without EU funding, the provision of new access services will be on regional or national agendas.

2. Main Deliverables

2.1. A Detailed Workplan for the Full-Scale Deployment of Mature Access Services (D1.1)

This deliverable is based on Annex 1 of the contract for the project, the Description of Work for DTV4All. It outlines the tasks that have to be completed so that the detailed scope of the pilot of mature access services that the project will undertake can be determined and approved by the Commission.

The document includes:

- The rationale for doing a Pilot of mature services.
- Clarification of the scope of digital television access needed for the Pilot.
- A detailed breakdown of the goals and outcomes for Work Package 1 (WP1) of the project, essentially what kinds of information the Pilot of mature access services (WP2) is expected to produce
- A workplan for each task in WP1 (who contributes to the planning, execution, quality assurance and signing-off of each task). (to be completed)
- A detailed timetable for completing WP1 by September 30, 2008.

The Description of Work of the project (c.f. pages 33-53) requires DTV4ALL to complete three sub-packages:

- WP 1.1 Which audiences, content and services – and how much? (i.e. provide details of the target audiences and their needs, the content genre of the access services that will be provided and some quantification of the services themselves)
- WP 1.2 On which devices and platforms? [Identification of the stakeholders in the supply chain. Which access services will be produced and delivered to which devices?]
- WP 1.3 Which business models and regulatory regimes? [Identification of the stakeholders external to the supply chain. How is agreement reached about the access services to be offered and funded?]

In order to complete the work packages, a framework for agreeing the objectives and scope the Pilot for mature access services itself is needed.

2.2. Final Report on Pilot Services (D2.5)

Summery

This deliverable is divided into two parts. The Part 1 report represents the full and final results and conclusions of the work done to date on mature services. The supplementary 'Final Report', Part 2, includes the final results of the work that was ongoing with the Universities Sub-titling team, at the time of compiling Part 1. This represents work that has been delayed due to issues encountered with the eye-tracking technology
that was a key element in the tests that were carried out.

Part 1, Section 2 - Introduction - explains the aims of the pilot and the rationale adopted for putting the findings and conclusions of the user studies of mature access services in a broader policy and strategic context. The focus here is on extracting information that looks at the match (or mismatch) between the needs of viewers and the mature access services available to get the most out of watching television.

Part 1, Section 3 - Goals and Outcomes - uses the structure from deliverable 1.3 to revisit the analysis of the needs of those with functional impairments and who are at risk from being excluded from watching television, demographic trends for the coming decade, current access service provision across Europe and three scenarios for their expansion in the coming decade. In terms of the supply side, the scenarios show the need to allow for a wide variety of circumstances for e-inclusiveness provision across Europe.

Part 1, Section 4 - Evaluation - is a review of the work done as of late January 2010. The section starts with a listing of the studies and the extent to which they are final or are to be provided in a new iteration in May 2010. The studies included here represent a rich and varied collection of research both in terms of their methods, findings and presentation. They also address important lacunae in our understanding of the workings of mature access services. To help the reader identify central issues and conclusions, we
have added sections 5 and 6 that build on what is reported in Section 4.

Part 1, Section 5 - Key Findings from the Viewer Perspective - collates the findings in terms of what can be termed an Access Service Maturity Model. It starts with six prerequisites for access services for television, first awareness levels for access services not only among those who would potentially benefit from them but also from the population at large. It continues with access to an appropriate digital television receiver and the ability of viewers to (re)configure them in order to receive TV and access services; and the extent to which viewers can discover, select and watch television programming for which access services are available. It concludes with a discussion of the attractiveness" of the access services considered and the extent to which they actually deliver on their e-inclusiveness potential.

Part 1, Section 6 - Conclusions of the Pilot of Mature Access Services - demonstrates that awareness levels both among those with impairments and the population at large need improving. The section identifies actions that could be taken to improve awareness and other measures of service use. Each of the main mature services is reviewed in turn. By and large, they are meeting the needs of many viewer groups with impairments. The conclusions do, however, highlight the need for ongoing actions to optimise access services to increase their attractiveness and perceived value. The main area of concern relates to live subtitles created using re-speaking. This method of generating subtitles is central to the scaling-up of subtitling for the deaf and hard-of-hearing to nearly 100% of television programming (already a requirement or soon to be a requirement in a number of member states). The issues of the delay in the presentation of the subtitles with respect to the main programme, the presentation differences in live subtitles between broadcasters and the factual and semantic errors that regularly appear in live subtitles all require renewed efforts to make live subtitling a service that really makes a difference to
those for whom it is intended.

The Part 2 includes the final results of the eye-tracking work that was conducted by the Universities Sub-titling team. This represents work that was delayed due to issues encountered with the eye-tracking technology that was a key element in the tests that were carried out. The Final Conclusions and Findings are available within the D2.5 part 1 Report.

The studies included here represent a rich and varied collection of research both in terms of their methods, findings and presentation. They also address important lacunae in our understanding of the workings of mature access services. The subtitling studies included in this report refer to internal deliverable 3 of the Subtitling team i.e. Report on eye-tracking tests, which includes a) opinion (referred to as post-test opinion, as these questions were asked after the test), b) comprehension (what the participants understood?), c) pure eye-tracking data (fixations and so on).

Tests carried out in the Universities, approximate 40,000 subtitles read by hearing, hard of hearing and deaf participants, which constitutes the largest corpus of its kind (eye-tracking plus comprehension plus opinion) and a treasure trove of information for research, further projects, etc. We can now attempt to map out, for the first time with this size of eye-tracking and questionnaire-base data, how hearing, deaf and hard of hearing viewers read and comprehend subtitles.

Tests Summary

Broadcasters Subtitling Tests
DR - Denmark 27 (various level of hearing impairment) – speed/delay
RBB - Germany 26 Deaf, 26 Hard of Hearing – appearance, font

Universities' Subtitling Tests

UAB - Catalonia, Spain	5 Deaf, 5 Hard of Hearing, 5 Hearing
UAB - Italy (Univ. Palma)	30, 30, 30
UAB - UK (Roehampton Univ.)	15, 15, 30
UAB - Denmark (Univ. Copenhagen)	28, 44, 60

With Eye-Tracking

UAB - Catalonia, Spain	5 Deaf, 5 Hard of Hearing, 5 Hearing
UAB - UK (Roehampton Univ.)	10, 10, 10
UAB - Poland (Univ. Warsaw)	12, 19, 11
UAB - Germany (Humboldt Univ.)	7, 7, 7

Audio Description

TVC - Catalonia, Spain	53 – various impairment
UAB - (Pear Tree Project)	about 20 subjects each, 12 languages

Key Findings

- Viewer Awareness of Access Services
- The viewer must have an appropriate (digital) receiver to receive the service
- The viewer must be able to set up the receiver or ask someone else to do so in order to receive the service in question
- The viewer must be able to find the programme and service on the receiver
- The viewer must have the necessary motivation to use the service
- The viewer must be able to derive benefit from the access service.

Conclusions

It draws conclusions about the extent to which the demand for access services is currently being met by the provision of access services in the countries covered by the studies and inferences about the current situation for those with impairments wishing to watch television across Europe. We can start with the original research question underpinning all our work with strategy and policy: Who needs to know what in order to be able to plan, produce, deliver, promote and successfully use mature access services by the end of 201x?

Television viewers with impairments
The studies highlight a truism that there is no one-to-one relationship between a given service and a group of viewers at risk of exclusion.
It is often the case that a given access service addresses multiple target groups, leading to some kind of design trade-offs, so that as many as possible benefit from the service.
In terms of the issues identified by the Pilot Study of Mature Access Services, we can conclude that:

- Interlingual subtitles and dubbing for prerecording television programming are truly mature access services where the issues with service provision are well understood and where ongoing optimisation is possible
- Interlingual subtitles could do an even better job of reducing exclusion of viewers of programming in foreign languages by as many as 10-20% of the adult population who either have receptive aphasias or weak reading skills by offering spoken subtitles produced centrally using speech synthesis
- Intra-lingual subtitles for prerecording television programming face some challenges, depending on whether the country belongs to a region that traditionally offers dubbing or subtitling for foreign language television programme. As the service is not in-vision but optional, closed subtitling, the major challenge is the lack of awareness of their existence. Awareness level studies demonstrate this among the deaf, the hard-of- hearing, those who find it difficult to follow spontaneous, fast-paced dialogue in their own language and immigrants for whom subtitling could facilitate comprehension and indirectly promote social cohesion.
- Intra-lingual subtitles for live television programming face major challenges; the existence of a delay between the subtitles and the dialogue to which they refer is the major issue identified independently in three different studies (RNID, Roehampton, DR); the presentation of subtitles one or two words at a time rather than in blocks has a negative impact on reading; unresolved issues to do with the accuracy of subtitles produced through re-speaking; unresolved trade-offs between reading speed and the degree of text compression (ranging from verbatim transcriptions to considerably compressed subtitles that match the reading speed of a greater proportion of the audience)

- Visual signing is a truly mature access service where the issues with service production are well-understood, but where there are challenges, usually due to resistance from hearing viewers who resent in-vision signing in prime-time programming and who make their opinions felt to broadcasters and regulators. There are currently two kinds of visual signing programmes: assistive programmes made specifically for deaf viewers whose mother tongue is visual signing and inclusive programmes, where visual signing is added so that deaf viewers whose mother tongue is visual signing can also benefit from watching (e.g. news and current affairs programmes). Being able to offer opt-in visual signing solutions (delivered on emerging hybrid digital broadcast/broadband television receivers) represents an avenue could release resources from distribution budgets that could be re-invested in increased visual signing services.
- Audio Description for prerecording television programming faces some challenges, depending on whether the country belongs to a region that traditionally offers dubbing or subtitling for foreign language television programme. As the service can be either an opt-in Broadcaster Mix or Receiver Mix, the major challenge is the lack of awareness of the existence of such a service, compounded by the lower availability than, say, intra-lingual subtitles (even in the UK, less than 15% of programmes on major channels have AD compared with 99% SDH).
- Spoken Subtitles (Audio Subtitles) are more mature than is generally realised and can supplement interlingual subtitling to reduce the exclusion of persons who do not benefit fully from such subtitles because of poor reading skills or impairments such as receptive aphasias.
- Raising awareness should be the first but not the only metric for the success of an access service; a more adequate list of metrics would include:
  - Proportion of target group/population aware of existence of the service
  - Proportion of target group who intend to use the service in the next six months.
  - Proportion of target group who currently use the service infrequently.
  - Proportion of target group who have tried the service and stopped using it.
  - Proportion of target group who have been using the service regularly for less than six months
  - Proportion of target group who have been using the service regularly for more than six months.

- The role of other stakeholders in creating awareness and providing relevant and up-to-date information to citizens coming to terms with their impairments after accident or illness should be examined. In some Member States this is predominantly bodies and associations representing those with disabilities. In others, there are professionals in adult education and healthcare whose job it is to help individuals. There would seem to be synergies of working both on television campaigns and on information and dissemination activities targeting these other stakeholders who may have a significant impact on awareness of impairment and access services for digital television.

2.3. Recommendations on the Effectiveness and Efficiency of Existing Services Improvements (D2.6)

Context

DTV4All is project that promotes making television accessible. It focuses on the use of resources and technologies that are already in place to make television as accessible as possible to viewers with functional impairments. Access services of high perceived quality are the main vehicle of this accessibility.

Considerable progress has been made in the first decade of the century with the provision of access services in Europe. As digital switchover takes place country by country across Europe, we have a good understanding of what is required and how to produce and deliver access services such as subtitles, audio description and visual signing.

But we still have a number of challenges to face. In particular, we need to have a clearer idea of what we have achieved and what remains to be done.

Much has been done but much remains to be done in some member states on making regular programming on digital television more accessible irrespective of access service provision just by taking a little more care with the audio and the video layers. It should be possible to access basic functions of digital television without the assistance of other people, such as the electronic programme guide (EPG).

There is an abundance of experience with a variety of solutions for producing and delivering access services that can be tapped into, so that those getting started do not have to begin from scratch each time. Generally speaking, the technologies and solutions for broadcast television are mature, and the outstanding challenges are predominantly organizational, political or economic in nature. Yet the access service field is riddled with ignorance and misconceptions that lead to poorly-documented business cases.

Very few countries have achieved 100% coverage of subtitles for the deaf and hard-of-hearing and supply-side targets for audio description and visual signing are more modest. What we hope to achieve and how fast that progress is made varies considerably across the continent.

In terms of achievements, there is a lack of solid statistics needed to assess progress in television access services, although the EBU has taken steps to plug this gap with surveys of European broadcasters.

Crucially at the European level, one size clearly does not fit all when it comes to access services. Europe is a diverse continent when it comes to national and regional societies, their cultures and economic means. Some territories have come far with access services and are looking to consolidate and optimize them. Others have only just begun to offer one or more of these services and are feeling their way.

Generic recommendations

Optimise existing television and access service production

• Optimise existing television production

As television coverage of the 2010 World Cup Championship in South Africa showed very clearly, making sure that the picture and sound do their jobs makes all the difference to the viewing experience, especially when thousands of fans in the stadium are blowing Vuvuzela trumpets.

In less than two decades, television production has moved from being highly complex to being a field where nearly anyone can produce some content resembling television.
Professional norms and skill sets that were universal are not necessarily in place among those working with desktop-based TV production.

When it comes to the programme sound, making use of the know-how of sound engineers and basic common sense can go a long way to making the sound intelligible. Something similar applies with respect to the programme picture. Accessibility improves if someone checks that the picture, captions, graphics and subtitles are all aligned so that one visual element does not mask another and that the captions and graphics are legible.

Formalised design heuristics and guidelines can be of help, but this assumes that there is a mechanism to ensure that they are being followed. However, those involved with programme production will invariably take the steps necessary to optimise the viewers' experience of the programme once they have seen what a difference such details can make to their viewers. Therefore, the real challenge is to get the programme production team involved in a process of applying such guidelines in a few representative cases where their impact is clear.

This action is relatively cheap and easy to do and could make a big difference.

• Optimise existing access service production

There are a number of actions that can be followed to improve the efficacy and efficiency of access service production. These are listed in the section on "specific recommendations".

• Extend the metrics of access service provision

There are issues to do with targets that need to be resolved. Today these are mainly supply side metrics, with some measurement of access service awareness. There is a need to extend user targets to include use of and satisfaction with specific access services. This requires:

- Consensus-based action at national level to extend access service metrics
- Make resources available at national level to improve awareness and use of existing access services based on analysis of behaviour of the various target groups when seeking out information on this subject.

The public sector across Europe needs to be able to demonstrate value for money is a consequence of fiscal restraint. Both supply and demand-side metrics will be needed if access services are to be truly accountable. This action is not particularly expensive, but requires a significant investment of time and effort to achieve consensus on changing metrics.

Scale up access service provision and use

• Consult a range of national stakeholders

Striking a balance between the needs and interests of the various stakeholders has never been an easy matter. Given the current economic climate, the challenge is even greater.

Those representing people with various functional impairments would naturally like to see as much progress as fast as possible in the direction of full access services for all channels. But this is clearly something that cannot be done from one year to the next. Service level agreements reached during a time of economic restraint should be easier to scale up at a later point when European economies emerge from this period of fiscal restraint.

• Allow access services to move with the times

Regulators in most European countries that mandate access services and service level agreements usually specify targets for the proportion of television programmes on specific channels for which there has to be access services. The targets not only specify the channels but also the technical solutions that need to be used.

When television was predominantly delivered in analogue form through the ether to digital terrestrial receivers this may have made sense. In a world of multiple digital delivery platforms, however, this makes less sense.

Access services and users' needs and requirements are fairly clear and understood, and are largely independent of the delivery network and device on which they are required. As the technologies used at any time and on any platform will depend on both technical and economic factors (which can include the shortage of bandwidth on broadcast networks) it makes good sense to define services in terms of who they should serve and what they should do rather than provide a detailed specification of the technological solution to be used.

Using a service approach that can adapt to new technologies without significant impact on the service provider and whilst delivering the user-requirements (and measuring the outcomes with demand side metrics) ultimately will be beneficial for all those involved.

This action requires concerted efforts on the part of all those concerned but the outcome would hopefully justify such a commitment.

2.4. Final Report on Expert User Tests of Emerging Access Services (D3.6)

Summary

Audio Description (AD) is an additional audio track with narration for blind and visually impaired people. This service can be delivered using different techniques: over DVB-T with the help of a second pair of audio channels (broadcast/broadcast) or with the help of a shared distribution, broadcast and broadband via the air and the web (called a hybrid solution), even a fully web based solution can be considered called WebTV. Because the AD audio track can be delivered using technologies that are not currently tested for this purpose (see synchronisation issues in broadcast/broadband distribution), it is regarded as an emerging access service. Tests undertaken by TVC and supported by UAB are described here in this document. The services' usefulness received user approval, and audio description were very highly rated, not only as a tool for making content more accessible but also as a way of providing solutions for families with different needs. Given the above data, we can conclude that the proposed services have been given a high level of approval by consumers, that the services are easily accessible, and that their quality is high enough so as to consider launching them.

For most of the prelingual deaf, sign language is the essential means to get information. That's why the need for sign language on television should not be underestimated, even though the targeted audience is comparatively small. An individually selectable sign language service broadcast via the IP-channel seems therefore as an attractive option which also saves bitrate and hence costs for on-air delivery. Such a service can be accessed via hybrid set top boxes which have an additional Internet connection. The new hybrid receivers currently emerging on the market are not able to decode two parallel video streams which is an important pre-requisite for a truly hybrid broadcast-broadband solution where only the signing video is broadcast via the IP channel and then combined with the broadcast video on the actual device. Therefore IRT and rbb devised an HbbTV-based-solution where the user can access a video with a built-in signing video on demand via the IP-connection of a hybrid device. rbb's laboratory tests documented in this deliverable focused on two objectives: At first the users were to test the usability of this HbbTV-based demonstrator. The second part was focused on user feedback on important parameters for sign language interpreters on TV, mainly in preparing future truly hybrid solutions. The parameters were synchronicity, image size, video bitrate and video positioning.

Summed up, the novel HbbTV-video on demand solution was welcomed very much by the testers and usability was satisfying. Users demand individual settings for adapting the video image size and position. The majority of the testers support a complete simultaneous synchronicity between signer-Video and main broadcast video where even the "real world delay" is not there anymore.

Conclusions

Enhanced Audio Description - TVC, UAB

In short, the emerging services analyzed in this trial are technically viable, but some aspects of the quality of the service must be improved. The usability of these services, with respect to ease of use, was clearly validated by the participants in the trial and some suggestions were made for improving the graphic interface. The services' usefulness also received user approval, and audio description was very highly rated, not only as a tool for making content more accessible but also as a way of providing solutions for families with different needs. Given the above data, we can conclude that the proposed services have been given a high level of approval by consumers, that the services are easily accessible, and that their quality is high enough so as to consider launching them.

Acceptance Tests of Video Signing - RBB, IRT

Detailed and concrete recommendations on the single aspects of presentation and technological set-up of sign language solutions in digital TV will be extracted from the above test results and issued in the finalising deliverables of DTV4All.

Summarising the results of part one of this test, the novel HbbTV-video on demand solution was very much welcomed by the testers which shows that people are open to new approaches if they make sense to them. Concerning usability the presented solution was generally satisfying, it could however be improved in some smaller aspects. People want a service that is easy to understand and offers good usability.

Concerning synchronisation issues between the signer and the main video, the testers surprisingly welcomed a manually established total simultaneous synchronicity which overcomes even the real world delay. For reaching a high acceptance of de-synchronous videos a buffer size is needed which assures that offset limits of 1.76 seconds for a delayed signer and 4.16 seconds for signer ahead are not exceeded.

When it comes to video bitrates, the results show that the usage of modern state-of-the-art video codecs like H.264 can offer both an optimal image quality and small bandwidth for a signer video.

Speaking of the position of the signer video, people expect it to be on the right hand side of the screen, whether it is located at the top or in the middle. A light overlapping between both videos can save some space on the screen and guarantees sufficient image sizes without obscuring important information.

This test emphasized the desire for personal customization in order to fit the individual needs of deaf people, especially their individual seeing abilities. This needs to be addressed by the provision of possibilities for adapting.

2.6. Final Dissemination Plan (D4.4)

The Need for Dissemination

For the importance of access services to be recognised, it is necessary to emphasise that:

- Access services are not only for deaf and blind, but also for older people with age related impairments, people with cognitive impairments, people with limited education, immigrant and minority communities

For the roll out of access services for terrestrial television to be accelerated, it is necessary to acknowledge that:

- There are two potentially conflicting local policies on the provision of access services for terrestrial television; the traditional approach of providing them by terrestrial broadcast and the Hybrid TV approach where they are provided over a broadband Internet connection
- The remit of Europe's national broadcast regulatory bodies requires:
  - A country by country approach
  - Coordination of the national regulatory bodies through EU
- A pan-European technical solution for the delivery of access services by terrestrial broadcast may not be needed as existing standards could be used with minor changes to receiver middleware, for an elaboration of this point please see the "Current Situation" below.

Current Situation

The plan for the deployment of accessible Digital Terrestrial Television transmitters has been completed. On the transmission side:

- The Digital Video Broadcasting (DVB) standard is in use

  → DVB subtitles can be sent
- The MPEG-2 audio/video standard is in use (with some use of the MPEG-4 video standard)

  → Audio (sound only) access services can be sent on an extra audio channel (e.g. Audio Description (AD), clear audio, etc.)

  → An extra video stream (e.g. of a signer) could be sent in the private section of an MPEG-2 Transport Stream or a secondary Transport Stream on another channel could be superimposed over the main content, for this, a secondary turner and a special function on the receiver middleware might be required.

As long as enough radio frequency resource (spectrum) is available the access services mentioned above could be transmitted for “user mix” reception, i.e. the user can select to use or not to use the services. However, at the receiver end:

- UK and NORDIG member countries have middleware implementation guidelines and receiver compliance validation systems, i.e. The DTG‟ s “Digital Zoo” in the UK

  → DTV4All does not have to consider these countries from a policy point of view, except perhaps for “quota and priority issues”; quotas for the provision of access services can be abused unless very carefully introduced e.g. by broadcasting programming with access services overnight. Access services enhance the eInclusion immigrants and the poorest in society and action to enhance the social inclusion of these groups is a major political priority

- Most of the other EU member countries do not have middleware implementation guidelines

  → Receivers in these countries may not be able to present to the user unexpected additional access service content within a DVB transport stream and/or within the encapsulated MPEG-2 streams

  → Access service content may confuse the receiver resulting in a complete loss of service, undesired presentation of the service to the user and/or an incorrect presentation of the service to the user, as has already been reported in DTV4All pilot test results from RBB (Berlin, Germany)

  → The Commission needs to address the policy actions that need to be taken to remedy the above situation.

- Some EU member countries, in particular Germany and France, may have decided to take another approach toward future TV, Hybrid TV with a broadband Internet connection:

  → In these cases, no further developments are to be expected on existing broadcasting services

  → This is not an option for many EU member countries because of a lack of affordable broadband Internet services to the home.

Medium to Long Term Needs

The policy of the DTV4All project, and its advice to the EC in its role of working on a policy support project, is that there is a need for the Commission to make clear that if member states do not provide unequivocal evidence that substantial progress is being made on the roll out of access services for digital terrestrial television then by a certain date then national legislation will be introduced to ensure that such access services are provided.

Currently, any legislation to require the provision of access services for digital television would have to be introduced at the national and not the European level for reasons that include:

- The speed of terrestrial digital TV deployment is different from country to country
- At the national level local conditions such as the availability of spectrum and of high speed broadband connections can be fully and efficiently taken into account
- Only member countries' national regulatory bodies have the power of licensing and funding as the ITU allocates frequency resource to each member country without EC involvement.
- There are no EU-wide regulatory bodies that oversee broadcasting policy.

  → The EC may wish to consider establishing such a body similar to the one that oversees telecoms policy. i.e., the "Body of European Regulators for Electronic Communications (BEREC)

National legislation has already had a significant positive impact on the provision of access services in the United Kingdom.

To keep track of such developments, as they can potentially provide templates for other member states, the DTV4All project will make its exploitation plan a living document which it will regularly update to pay attention to digital TV access service regulatory developments in EU countries, for example Spain where a Royal Decree has recently been adopted.

Medium Term Road Map

- Targeting existing digital terrestrial television, possibly requiring minor amendments to receiver middleware
- Addressing the worst case scenario which is that the introduction of access services will mean some receivers will not work. Attention needs to be paid to:

  → Product life cycles = end of product support (a 3 – 5 year span)

  → Legal support at the national level to take into account consumer protection legislation

Long-Term Road Map

- Targeting next generation High Definition Television

  → will require being involved at the planning stage (a 7 – 10 year span)

  → Access services as a basic part of the general TV services

  → National and EU level legal support

2.7. Recommendations for Future Access Services, Devices and Platforms (joint D3.7 / D4.7)

Summary

This deliverable provides recommendations for future access services based on the results derived from the laboratory tests with pertinent user groups carried out in the DTV4All project. These laboratory tests are described in detail in the deliverables D3.2 – D3.6. The basis of these laboratory tests were so called demonstrators. These demonstrators called "Emerging Access Service Demonstrators" encompass Video Signing, Clean Audio, Reduced Playback Speed, Enhanced Audio Description, Enhanced Text Services and Text-to-Speech Applications.

The current document elaborates the conclusions which can be drawn from experiences gained through laboratory testing of each individual demonstrator taking into account the respective test set-ups and methodological approaches. This deliverable also deals with how the knowledge gained in this project could be applied in the real broadcast world.

Sections 2 analyses the results obtained from laboratory tests of the demonstrators. For each demonstrator individually tailored recommendations are given.

In Section 3, an attempt is made to compare the benefits of the different access services and to give generic recommendations for future application within the European Union with respect to implementation and dissemination issues.

Finally, Section 4 provides some web references where further information can be found in relation to these services.

Generic recommendations

Conclusions

The analogue switch-off provides two forms of opportunities to improve access to digital television for those with physical, mental or age-related impairments:

1. To extend the provision of existing mature access services to European countries that do not currently provide them.
2. To provide new kinds of access services known as emerging access services such as those described in this document.

3. To provide the capability to personalise access services to meet individual needs.

To ensure the challenge is addressed, DTV4All took action on identifying, assessing and promoting emerging access services.

Final remarks

The most valuable contribution DTV4All could make was to identify the enablers that will allow a core set of emerging access services to be offered in all European Union member countries now or in the near future.

These key emerging access services were identified and described in a series of deliverables. The devices and platforms needed to support them in terms of technological feasibility, their perceived value to their intended users, and their business model viability have been described and demonstrated in the project.

Recommendations have been provided to bodies representing stakeholders in the access service value chain on the basis of which these bodies can take appropriate action in relevant standardization bodies.

2.9. Workshops: European Parliament (Workshop on Barrier-Free Digital Television in the European Parliament – D5.2)

Workshop on Barrier-free Digital Television in the European Parliament

DTV4All Workshop at European Parliament was held on 28 October 2010 hosted by MEPs (Ms Adriana Ticau, S&D; Dr Adam Kosa, EPP) with supports from "Science and Technology Options Assessment" of the European Parliament. The workshop was web casted by the European Parliament with a sign language interpreter provided by Brunel University. The Deliverable D5.2 contains the agenda and the Report from the Workshop.

At the workshop, left to right in the front row MEPs Ticau and Kosa, M Gonzales (European Commission, Deputy Head of Unit, ICT for Inclusion, DG Information Society and Media), Ms Balucka-Debska (DTV4All Project Officer)

The guest speakers include;

- Dr M Magennis of National Council for the Blind of Ireland on behalf of European Disability Forum
- Mr F Kamperman, Philips on behalf of DIGITALEUROPE
- Mr E Wilson of EBU

A short demonstration was presented:

- Philips' integrated digital TV with Text-to-Speech engine
- BBC's current accessibility service (Audio Description, subtitles) – Brunel University
- Switch from Broadcast (without sign language translator) to Internet delivery (with sign language translator) – Brunel University

Mr Kamperman of Philips presenting an integrated digital TV with a TTS engine at the workshop

All the presentation slides and a capture of the webcast are available on the Project Web Site (http://www.psp-dtv4all.org/)

2.10. ITU-EBU Joint Workshop on Accessibility to Broadcasting and IPTV ACCESS for ALL (D4.8)

Summary

This workshop took the form of an International Telecommunications Union (ITU)-European Broadcasting Union (EBU) Joint Workshop on Accessibility to Broadcasting and IPTV ACCESS for ALL, Geneva, Switzerland, 23 – 24 November 2010 in cooperation with the EU project DTV4All.
The guest speakers include:

- Mr David Wood, EBU (European Broadcasting Union), Chairman, ITU-R Working Party 6C
- Dr. Takayuki Ito, NHK (Japan Broadcasting Corporation)
- Mr Nick Tanton, BBC (British Broadcasting Corporation)
- Mr Masahito Kawamori, NTT (Japan), ITU-T IPTV - Global Standards Initiative Coordinator
- Mr Frank Kamperman, Philips/Digital Europe
- Mr Dan Pescod, Royal National Institute for the Blind/ European Disability Forum
- Ms Ulrike Haltrich, Sony Europe, IEC/TC 100

Attendees at the workshop, left side of the theatre in which the presentations were given. The screen on the left provided live captioning of the workshop proceedings

All the presentation slides and a recording of the webcast are available on the ITU Web Site (http://www.itu.int/ITU-T/worksem/accessibility/20101123/programme.html)

The RAI demonstrations

The RNIB demonstration

Conclusion of the Workshop (a report to ITU-T SG 16 and ITU-R WP 6C)

This is a report from the ITU/EBU/DTV4ALL WORKSHOP ON ACCESS SYSTEMS, Geneva, 23 - 24 Nov 2010 to ITU-T SG 16 for action and ITU-R WP 6C. Its purpose is to provide a basis for the possible creation of a Focus Group by SG 16 (meeting from 14 - 25 March 2011), that would study the issue of accessibility for audio-visual media. Participation in this Focus Group is open to all stakeholders in this issue (user associations, broadcasters, Internet service providers, manufactures, standardization organization, etc.).

Study Group 6, Working party 6C, has established a Rapporteurs Group on Access Systems, and there is a body of work reported to this group, which outlines a number of elements of access systems for broadcasting, and highlights the UN Resolution on the Rights of Persons with Disabilities, and the Resolution of the recent ITU Plenipotentiary Assembly calling on the ITU to work on Access systems. This Rapporteur Group is led by Peter Looms (Denmark).

It is therefore proposed that the Terms of Reference of such a Focus Group should include the following:

1. To determine how to involve all stakeholders including potential users in the development of such access systems. For users, the principle "nothing about us without us", must be applied to any system development. The Workshop recognized that there was a clear need to coordinate the technologies that can be used to aid those viewers and listeners with disabilities to gain maximum benefit from media delivered by broadcast, cable, IPTV, and Internet. The target is to make access service requirements independent of the delivery platform.
2. To develop pertinent system specifications which support the established service requirements.
3. To encourage the availability and use of access services on behalf of all users, making “accessibility to all” a principle for AV content delivery (i. e. universal design in line with the UN Convention).
4. To encourage access service interoperability.
5. Actively to promote the use of systems for access services which apply internationally agreed standards for a given delivery platform.
6. To prepare guidelines on the implementation of the UN Convention on the Rights of Persons with Disabilities for digital AV media delivery.
7. To prepare guidelines for the inclusion of access services in all digital terminals.

Consequences of the above actions

As a result of the discussion in the workshop, ITU-T has set up a Focus Group on Audiovisual Media Accessibility (http://www.itu.int/en/ITU-T/focusgroups/ava/Pages/default.aspx) that is chaired by Mr Peter Looms (a DTV4All participant from Danmarks Radio), and commissioned a discussion document on "Making Television Accessible". As the nature of the document was very similar to the Deliverable 4.6 "Descriptions of the Mature Access Services and Guidelines for their Implementation throughout Europe", the discussion document was also labelled as D4.6.

2.11. Descriptions of the Mature Access Services and Guidelines for their Implementation throughout Europe (D4.6)

What is this report about and who is it for?

This report looks at the strategic implications of making audiovisual content accessible to persons with disabilities. The focus includes not only the content itself, but also the information and devices needed by people to enjoy audiovisual content.

The term "audiovisual content" is a broad term used to cover time-based works with both pictures and sound. In numerical terms, the most widely used kind of audiovisual content today is television. But audiovisual content also includes cinema films and videos distributed on other networks (for example the Internet and mobile telephone networks). It also includes audiovisual content distributed on physical storage media (pre-recorded videos on cassettes, CDs and DVDs, recordings on hard disc and flash-memory devices such as Personal Video Recorders, computer games delivered on storage media, online or both).

In the nineteen nineties, digitalization began to have an impact on the distribution of audiovisual content. Television is going digital. Analogue transmission has already been shut off in many countries around the world. We can expect the switch to digital distribution to be complete sometime in the next fifteen years. Similarly, digital cinemas are on the increase. Consumers use their computers, tablets or smart phones to access television, video and music. The Internet has become a means of sharing not only television but also short-form video content via portals such as YouTube.

Although the aim of this report is to address audiovisual works in general, the focus is on television, in particular Digital Terrestrial Television (DTT).

The rationale for this approach needs to be mentioned. While the production or authoring of access services is much the same for any digital time-based medium, when it comes to the Internet there is a wide variety of distribution solutions on both the open Internet and on IPTV. There are currently more than 12 widespread IPTV solutions and the number is growing.

Some of them build on the work of the World Wide Web Consortium (W3C) and the Open IPTV standards and its rigorous stance on intellectual property so that the standards are truly open. Others are based on ad hoc industry consortia.

One such group is the Web Hypertext Application Technology Working Group (WHATWG) that has made proposals for handling access services as part of HTML5. Another is the Digital Entertainment Content Ecosystem (DECE) working on a Digital Rights management system allowing digital audiovisual content to be accessed from multiple devices. Ultimately the availability and cost of providing access services on Internet-based platforms will be determined in the market place by the relative success of these contenders.
As the principles behind the creation, exchange and delivery of access services are the same. This report concentrates on examples of good practice from broadcasting. Broadcasting is a highly regulated area where standardization has been successful in achieving interoperability and is beginning to deliver significant results. While there are four major digital television ||families|| of standards at the global level, they all build on the same basic building blocks such as the MPEG2 and MPEG4 encoding and decoding standards and have well-defined mechanisms for creating, exchanging and delivering access services. Good practice from broadcast television can be adapted and then applied to the authoring and digital distribution of other kinds of audiovisual content.

Apart from going digital, the characteristics of audiovisual content continue to change. There has been a move towards better picture quality (High Definition), multi-channel audio, three-dimensional images and also the inclusion of interactivity. While the report cannot address all of these topics, it can provide strategic pointers to action in the short, medium and long term.

The report is written with a range of decision-makers in mind:

- Access service advocates from organizations representing persons with disabilities wishing to get a clear picture of the access options currently available and in the development pipeline.
- Decision-makers from digital media concerned with access service provision.
- Regulators and authorities working on measures to improve digital media accessibility as well as
- Consumer electronics manufacturers and sales outlets examining the implications of legal and demographic change on their business.

The report aims to help the reader with the following kinds of strategic challenge:

- Formulate the objectives and Key Performance Indicators to make television accessible in a given territory.
- Set up from scratch and operate one or more access services on analogue television.
- Plan the transition from analogue to digital television and the access services that accompany television programs.
- Conduct pilot tests of a new access service on digital television.
- Scale up access services after completion of a pilot phase.

Common to all of these challenges is the ability to identify the nature and extent of the access challenge. The report starts here by first looking at the needs that have to be addressed by accessible television.

The report then goes on to explain in general terms what the options are for improving the accessibility of television. In subsequent chapters there is more about the options for producing and delivery access services, and what they cost to establish and run.

It concludes with coverage of change management – metrics, key performance indicators and processes to get started. Mention is made of a range of legal instruments that can be used to ensure that a new access service, or an existing service that is scaled up, becomes a success.

3. Summary

Summary of the Work Done

In the DTV4All Project, Work Packages 1 and 2 instigated a series of tests on Mature Digital TV Accessibility Services, including;

- Broadcasters' Subtitle Tests in DR - Denmark, rbb - Berlin-Brandenburg (Germany) and TVC - Catalonia (Spain)
- Subtitling Tests through universities in Catalonia (Spain), Italy, UK, Denmark, Germany and Poland
- Audio Description Tests in Catalonia (Spain) and through Pear Tree Project (Belgium).

The results from the Broadcasters' Subtitle Tests presented a model of DVB subtitle implementation, its effectiveness and the appreciation of the users. The Subtitling Tests through universities demonstrated issues related with the speed of subtitle and the comprehension of subtitle. Audio Description Tests also presented its effectiveness and the appreciation of the users.

Work Package 3 carried out a series of expert lab tests on emerging Digital TV Accessibility Services, including;

- Enhanced Audio Description
- Video Signing

With the results from the above, the recommendations are made in the Deliverable D3.7/D4.7.

Work Package 4 accomplished surveys and analysis the results on the available technologies and the regulatory aspects surrounding the Digital TV Accessibility Services. The results were presented at the Workshop on barrier-free digital television in the European Parliament (Brussels, Belgium, October 2010) , at the ITU-EBU Joint Workshop on Accessibility to Broadcasting and IPTV ACCESS for ALL (Geneva, Switzerland, November 2010) and other occasions. The Deliverable D4.6 "Descriptions of the Mature Access Services and Guidelines for their Implementation throughout Europe" became a base document for the discussion in ITU-T Focus Group on Audiovisual Media Accessibility that would investigate how the UN Convention on the Rights of Persons with Disabilities can be implemented in the Digital TV domain.

Final Remarks

As far as we are concerned, there are enough industry standards enabling accessibility services on Digital Public TV Broadcasting in Europe, such as;

- Subtitles – DVB subtitle with DVB standard
- Audio Description, Audio Subtitles – MPEG multichannel audio with MPEG-TS
- Sign Language (user mix) – MPEG-TS and DVB standard

On the other hand, the production of the accessibility content and the regulatory bodies may need some attention. For example, broadcasters and production companies in some EU member countries, who have implemented real-time subtitling, have an access to speech-to-text conversion software. Some EU member countries with less popular national languages may not be able to afford such software, due to lack of commercial demands. This might be the same for text-to-speech software for visually impaired users. We could extend this analogy to text-to-sign language (and *v.v.*) translators. However, so far, the users' perception on sign language avatars are not so good, due to the lack of detailed facial expressions on emotion *etc.*, resulting limited applications – weather forecast in Denmark and Italy.

Besides, regulatory bodies (or their appointed agents) in some EU member countries monitor and implement their countries' DTV provisions vigorously. However, in some EU member countries, nobody monitor their DTV provisions, resulting Set-Top-Box malfunctions when a new service is implemented on a broadcasting signal, even the implementation of the new service is within a standard being implemented. Also, broadcasting regulators in some EU member countries, invite user organisations to prioritise the needs and receive their feedback on the accessibility service.

So far, each EU member country controls their public Digital TV service provisions, including its frequency allocation and funding. Due to the nature of public broadcasting – remit within a country and/or a local region, it could be the best way. This also suits to the local culture and the nation's policies in education (especially impairments in hearing and sight), economics and social care policies.

In the life time of the DTV4All Project, one of the partners, RBB – a regional public broadcaster in Germany on ARD Network, tested and successfully implemented the DVB subtitles on their broadcast service. This influenced to other regional and national broadcasters in Germany. In the process of the DVB subtitles tests, there were some problems and deficiencies that were reported in D2.5. Some of the short-term solutions were tested and implemented in a shape of the enhanced subtitles with HbbTV that were reported in D3.6.

In parallel with the above RBB's work, DR (Denmark), TVC (Spain), RAI (Italy), BBC via Red Bee Media (UK) and EBU reported the current situations and any obstacles on the deployment of accessibility services in these countries, from the production to the operation. DR complied the information into Deliverable D4.6. - "Descriptions of the Mature Access Services and Guidelines for their Implementation throughout Europe" that was also presented to ITU-T Focus Group on Audiovisual Media Accessibility.

With a help from European Broadcasting Union (technology and production) and DigitalEurope (receiver provisions), the European Commission may be able to co-ordinate the activities on accessibility services through AVMS contact group and/or an appropriate body. In parallel with this, it is essential to raise the awareness of the users and the regulators – what kind of Accessibility Services could be available within the current Digital TV provisions. Please also note that the private TV companies may follow the public TVs, once the privateers see a business opportunities – such as Sky TV (UK), with regard to their Audio Description services.

4. Appendix

1. Dissemination Activities

- A flyer on the project was prepared by Brunel which was made available when the project web site went live on 30.08.2008
- A DTV4All related presentation was made by Pablo Romero & V. Arnáiz at: Amadis08, III Congreso de Accesibilidad a los Medios Audiovisuales para Personas con Discapacidad, AMADIS'08. Barcelona (Spain) – 30th June & 1st July. Auditorio de la ONCE en Barcelona.
- A presentation was made on "Implementing Audiovisual Accessibility through eye tracking" by P.Orero and V.Arnáiz at the Conference: "Tobii Eye Tracking Conference on Psychology and Vision Research" in Berlin (Germany), 24th of July 2008.
- P. Orero gave an interview with the Spanish Official Accessibility Centre CESyA –Centro Español del Subtitulado y Audiodescripción" to inform them about the DTV4ALL Project. The outcomes of this were:
  - Details of the DTV4All project have been published on the CESyA web site.
  - CESyA is interested in disseminating the DTV4All project and has offered the project any non-confidential information in its possession the project may require.
- In August 2008 TVC prepared 2 articles for local and national (Spanish) newspapers on the project.
- On 1 September 2008 RBB presented DTV4All to the ARD subtitle representatives at their annual working meeting on occasion of IFA 2008.
- On 19 September 2008 RBB held a meeting with RBB responsible persons in accessibility issues, including a presentation of project plans and preparation of future cooperation.
- In October 2008 Peter Looms mentioned the DTV4ALL project at the Arab State Broadcasting Union seminar on multimedia production and distribution in Tunis, Tunisia at the invitation of the ITU (who paid for his travel and accommodation).
- Sabine Braun and Pilar Orero gave a presentation at the Berlin Conference, Languages and the Media on 20 October 2008. The presentation showed the first step towards audio subtitling presenting the problems which are created when reading subtitles does not take into consideration the cohesion with the image. http://www.languages-media.com/conference_programme.php
- Verónica Arnáiz Uzquiza and Anjana Martínez Tejerina, also gave a presentation at the Berlin Conference, Languages and the Media on 31 October 2008. Their presentation "Twofold Approaches on SDH Research: From Personal Information to Scientific Tools" showed the DTV4ALL approach to qualitative questionnaires, since past experience in a Spanish Subtitling project with personal and quantitative questionnaires has made the project go for eye-tracking technology and customized tests.

- 29 November - 02 December 2008 the project demonstrated the 1st phase demonstrator of the synchronous delivery of broadcast digital TV and an accompanying video of a signer provided over an IP connection at the e-Inclusion Ministerial Conference and Exhibition in Vienna (Austria).

DTV4All Desk in e-Inclusion Ministerial Conference and Exhibition

- Anna Matamala, Pablo Romero, and Cristobal Cabeza ran Audio Description and subtitling in real time workshops 3/14 November 2008 at the CITA 2 Conference in Barcelona (Spain) http://www.citaudiovisual.com/Programa.html
- Peter Looms gave a public lecture 3 December 2008 on DTV4ALL in Hong Kong paid for by University of Hong Kong
- Pilar Orero presented the Audio Description part of the project at the MUTRA Conference, 5-7 December 2008, Munich (Germany) http://atrc.info/images/2008_MuTra_Audiodescription.pdf
- In January 2009 RBB made a contribution to the website of Brandenburg's Social Ministry in Cooperation with Associations for the disabled in DTV4All. This is updated regularly.
- On 3 April 2009 RBB presented DTV4All and the RBB Field tests at a meeting of the Berlin Senate's Working Group for Communication and Sign Language.
- On 8 May 2009 RBB gave a presentation of DTV4All and the RBB Field tests at the EBU Eurovision Summit Teletext and Subtitling Group in Lucerne.

- Peter Looms of DR presented statistics on public service broadcaster activities in access services for 2009 gathered as part of the work of DTV4All project at the EBU Eurovision Summit Teletext and Subtitling Group on 8 May 2009 in Lucerne, Switzerland.
- On 3 June 2009 RBB presented DTV4All as an example of a successful ICT PSP project to the Brandenburg Economic Development Board in Potsdam, Germany
- Key note address: P. Looms, 2009, "Blended Learning for Some or for All?" 2009 International Conference on ICT in Teaching and Learning, 6-8 July 2009, Hong Kong
- New RBB innovation project flyer including DTV4All July and August 2009
- New RBB innovation project website including DTV4All July and August 2009
- IBC Presentation, Amsterdam, 10 – 15 September 2009; T. Itagaki, M. Haque (Brunel), C. Dosch, W, Bruecknar, M. Probost (IRT), S. Glaser (RBB), P. Looms, P. Mølsted (DR)

DTV4All booth in EBU Village, IBC 2009

- RBB presented the project and its activities at the RBB's IFA booth from 4 to 9 September 2009.
- On 8 September 2009 Annette Duffy of RBB presented the DTV4All project to ARD affiliate SWR's broadcasting council in Potsdam, Germany.
- On 18 September Bettina Heidkamp of RBB presented the DTV4All project at the Annual Yearly Meeting of The German Association of the Hearing Impaired in Hannover.
- In October 2009 IRT provided information to the EBU on the status of "Audio Description in live sport events"

- On 6 October 2009 RBB held a meeting at RRB meeting with the Impairment Associations that support RBB's work in DTV4All. 6 representatives of the Berlin and Brandenburg associations were invited and participated and 6 people from RBB were present including a representative of the Department of Production and Operation and the responsible RBB Subtitle editor. Bettina Heidkamp presented the project activities of 2009 and gave an outlook to the planned tests and work efforts.
- IRT provided PPT information to the 51st meeting of the Production/Technical Conference of the German public service broadcasters in Strasbourg on October 21-22 dealing with DTV4All access services.
- UAB staff attended the Media Access for All Conference in Antwerp (Belgium) 21-25 October 2009 where an annual meeting of the DTV4All university teams carrying out user tests was held. The following DTV4All papers were presented at the Media Access for All Conference:
    - The Reception of Respoken Subtitles (Pablo Romero Fresco)
    - SDH Eyetracked (Verónica Arnáiz Uzquiza)
- On 30 October P. Looms of DR reported on the provisional reports of the DTV4All studies in Denmark at the Danish Ministry of Culture conference on Digital TV and Accessibility on October 30 in Copenhagen.
- Presentation: Pablo Romero Fresco, How to Wreck a Nice Beach ... Fast: Edited vs Verbatim Respeaking, Roehampton University, UK and Transmedia Research Group, 7th International Conference and Exhibition on Languages and the Media, October 29-31, Berlin Germany
- P. Looms, P. Mølsted and Johnson of DR were involved in a meeting on 13 November 2009 with 55 teachers from the Center for Special Education of Adults in Amager, Denmark
- The DTV4All project was presented to RBB's office of corporate development and to the Technical Committee of ARD in November 2009.
- P. Mølsted of DR presented findings of DR user tests at NORDIG on 1 December 2009 in Stockholm (Sweden).
- In January 2010 Red Bee staff were interviewed by Julia Glotz from New Media Markets regarding the general progress of the DTV4All project
- Through January 2010 DR staff contributed to ongoing work in NORDIG on changing standards to handle live subtitles better
- In January 2010 IRT participated in the standardisation work within DVB working group CM-IPTV concerning future hybrid TV set-top boxes. As a spin-off of the work within DTV4All a new profile is defined in DVB dealing with synchronisation aspects between the web and the TV world.
- In January 2010 the DTV4All project was introduced to an internal RBB work group which is responsible for RBB's reporting on Access Services to the ARD Technical Committee PTKO.
- In February 2010 the Dissemination Manager provided material for an EBU ‘TV Committee’ meeting presentation by Ed Wilson on Access services.

- In March 2010 DR continued to contribute to ongoing work in NORDIG on changing standards to handle live subtitles.
- Book published: Anna Matamala & Pilar Orero (eds) LISTENING TO SUBTITLES Subtitles for the Deaf and Hard of Hearing, Peter Lang AG, 2010.
- Presentations made at Eurovision TV 2010: Eurovision Teletext & Subtitling Experts 20 April 2010:
    - Bettina Heidkamp, RBB, "What users would like their DVB-subtitles to look like and: How to make an HbbTV-Text service barrier free"
    - Peter Looms, DR, "Live subtitles and hearing impairments: Making a Difference"
    - Dr. Pilar Orero, UAB, "Optimising subtitle reception: Subtitles for all - Large scale user evaluation of subtitles in seven European countries"
- Article published: W. Brückner, Digitales Fernsehen zukünftig barrierefrei, Fernseh- und Kinotechnische Gesellschaft, FKT, April 2010
- Article Published: P. Looms, DR, "The case for DTV access services", EBU TECHNICAL REVIEW – 2010 Q2
- Conference on disability and personal autonomy through education, Universal accessibility and employment 19 - 21 May 2010 in Zaragoza (Spain) exhibition presented by Brunel (T. Itagaki and M. Haque), and UAB (P. Orero)

DTV4All stand in Conference on disability and personal autonomy through education, Universal accessibility and employment
– demonstrated by Brunel and UAB

- Christoph Dosch of IRT published a DTV4All item on Barrier Free Television in tech-*i* insight from EBU technical, issue 5, September 2010.
- DTV4All demonstrations were presented at IFA 2010 3-7 Sept 2010 which are reported in D4.5.

IRT booth in IFA 2010

- DTV4All demonstrations were presented at IBC 2010 9-14 Sept 2010 which are reported in D4.5.

DTV4All booth in EBU Village, IBC 2010

- Pablo Romero-Fresco gave a presentation on 'The Reception of SDH' in Europe at Languages & the media, 8th International Conference & Exhibition on Language Transfer in Audiovisual Media, 6-8 October, Berlin (Germany)
- A DTV4All project workshop on Barrier Free Television was delivered at the European Parliament (Brussels, Belgium) on 28 October 2010. This activity is reported in D5.2.

At the workshop, left to right in the front row MEPs Ticau and Kosa, M Gonzales (European Commission, Deputy Head of Unit, ICT for Inclusion, DG Information Society and Media), Ms Balucka-Debska (DTV4All Project Officer)

- 5 November 2010 Pilar Orero of UAB gave a presentation on DTV4All to the Congreso Internacional de la Red RIID LLSS, Universidad de Sevilla (Spain)
- The paper by Peter Looms, 'The future of DTV access services was published in the EBU Technical Review 2010 Q4.
- 17 November 2010 the Project Coordinator responded to Thomas Kernen of Cisco Systems who had contacted him with regards to the development of use cases related to Picture in Picture (PiP) capabilities. As part of the commercial requirements for the PiP use case, Cisco wish to include capabilities related to people with hearing disabilities and therefore sign languages.
- The final DTV4All project workshop at the European Broadcasting Union (EBU) took the form of an ITU-EBU Joint Workshop on Accessibility to Broadcasting and IPTV ACCESS for ALL, Geneva, Switzerland, 23 – 24 November 2010 in cooperation with the EU project DTV4All. This activity is reported in D4.8.

Attendees at the workshop, left side of the theatre in which the presentations were given. The screen on the left provided live captioning of the workshop proceedings

RAI demonstrations

- 25-28 November 2010, IRT participated on behalf of DTV4All in the yearly symposium of the Association of "Tonmeister" (sound engineers) which took place in Leipzig, Germany.
- 2-3 December 2010 the Project Coordinator gave a demonstration at the European Day of People with Disabilities 2010 conference in Brussels which was visited by HRH Princess Astrid of Belgium who is the head of Belgian Red Cross and who showed her interest in access services on TV, especially AD.

Stand in Preparation – e-poster and BBC's Accessibility Demo - presented by Brunel

- 20 December 2010 the EBU notified the Dissemination Manager that a public video the ITU-EBU Joint Workshop on Accessibility to Broadcasting and IPTV ACCESS for ALL, Geneva, Switzerland, 23 – 24 November 2010 in cooperation with the EU project DTV4All had been made available on YouTube at http://www.youtube.com/watch?v=R7s47W4BDDs and that subtitles would be added to this video. An extended version of the video is available to EBU members at http://tech.ebu.ch/events/itu-ebu-dtv4all_workshop10
- 14 January 2011 the Project Coordinator presented the DTV4All Project at the 3rd Workshop of the Indra/Fundación Adecco Chair in the Universidad Politécnica de Madrid and participated in a roundtable on Television as a mean to reach the social and work integration representing DTV4All, at Alcobendas, Spain.
- 20 January 2011 The Dissemination Manager gave a presentation on the final outcomes of DTV4All to the Brunel University Electronic and Computer Engineering Industrial Advisory Panel which includes senior representatives of a number of UK companies and organisations including Thales, and the BBC.
- Since 25 January 2011 RBB has broadcast DVB-subtitles over DVB-T in regular operation. The ARD channel in RBB's DVB-T bouquet is now also broadcasting DVB-subtitles. As compared to RBB's DTV4All test operation this required an additional investment plus additional backup technology for the RBB channel. The design of the broadcast DVB-subtitles is the exact outcome of the RBB DTV4All user field test. A licence for Tiresias Screenfont, the wished for font by the users was purchased as an additional investment.
- 27 January 2011 Dissemination Manager attended the DTG Usability Group meeting, London.
- Dr Pablo Romero appeared on a BBC programme called "See Hear" that is specialised for viewers with hearing impairments. Its Series 30, Episode 30, was originally transmitted on BBC Two (England, Wales, N Ireland) from 1:00 pm Wed, 2 Feb 2011. In a part of the programme, the subtitle generation activity from DTV4All partner Red Bee Media was presented followed by Dr Romero's contribution on subtitle issues. The URL for YouTube http://www.youtube.com/watch?v=u2K9-JPIPjg includes these parts. As the BBC itself uploaded the file to YouTube, DTV4All does not have to worry about the copyrights issue, as long as it is viewed from YouTube. This URL is listed on the Project web page, together with another URL for AD samples done by the RNIB.

Dr Pablo Romero appeared on a BBC programme "See Hear"

- 22 February 2011 the Project Coordinator emailed some clarifications on DTV4All to Vera Strnadova, who is deaf and lives in the Czech Republic (CZ). She is Chair of the Commission on subtitling in CR. She informed that Project Coordinator that she had learned of DTV4All from the European Federation of Hard of Hearing and had told her colleagues in Slovakia about the project. Also that she has written about DTV4All to the CZ Ministry of Industry and Trade and to the Director of the Office for Standards in CZ, as well as to Czech Television.
- In the period January-March 2011 UAB created a collaborative free online resource centre for Media Accessibility. It is almost ready and has 200 entries on audio description, 200+ on subtitling and 90 on voice-over.
- The book has been written: The Reception of Subtitles for the Deaf in Europe that will be published by Peter Lang edited by Pablo Romero. The plan is to have it published by the end of 2011.
- In March 2011 UAB hosted the Audio Description conference ARSAD III where DTV4ALL is part of the organisation, and the logo is on the web http://jornades.uab.cat/arsad/ Peter Looms of DR gave the opening speech and spoke about DTV4ALL. XVS of TVC: participated in Panel 5A, III Advanced Research Seminar on Audio Description.

- 31 March 2011 the Dissemination Manager provided text on DTV4All to the UK Foundation for Assistive Technology (FAST) project for inclusion in its Annual Parliamentary Report. The UK Department of Health has a statutory requirement to produce such a report (pursuant to Section 22 of the 1970 Chronically Sick and Disabled Persons Act) and the FAST report documents the projects funded by the UK government and by the EU and gives active links through to the project information that is regularly updated on the FAST database.
- On 25 May 2011, DTV4All Workshop was held at Brussels (Belgium), in conjunction with the Project's Final Review. The main target audience was the members of Contact Committee for the Audiovisual Media Services Directive.
- At the invitation of the Project Officer, DTV4LL contributed with a presentation on DTV4ALL in Workshop 9 ("Barrier-Free Europe") at the 1st Digital Agenda Assembly on June 16, 2011 in Brussels.

Mr Looms presenting at Digital Agenda Assembly

2. Cooperation with other projects/programmes etc.

- In August 2008 Peter Looms (DR) made contact with ITU, Telstra (Australia), TV Globo (Brazil) and Brazilian regulator about the work of the project.
- In September 2008 Pilar Orero (UAB) made contact with two important deaf users: Chas Donaldson in Scotland and Maria Urbano in Barcelona. Both work at universities and can provide other meaningful contacts. Long questionnaires were drafted and sent to these two deaf people, who commented and we are not refining the questions.
- In September 2008 Peter Looms (DR) contacted the ITU about the G3 ICT Toolkit for Policy Makers on e-Accessibility & Service Needs for Persons with Disabilities.
- In December 2008 the Project Coordinator gave a telephone interview to "Ramboll Management A/S" for "evaluate the implementation of the ICT PSP".
- In December 2008 RBM had a meeting with Nick Tanton of the BBC about signer positioning and circulated the information gained to the DTV4All partners.
- In December 2008 the Project Dissemination Manager attended Digital Television Group (DTG) subgroup meetings on Audio Description, High Definition subtitles, and Human Interface; prepared an distributed notes of these meetings
- In February 2009 the Project Coordinator was in communication with "FAST - Foundation for Assistive Technology", a UK charity, about the project.
- On 9 March 2009 Peter Looms (DR) had a meeting with Nordija to modify a simple open-source tool for the holistic tests of users with hearing and/or age-related impairments for use in the DR pilot.
- In May 2009 DR continued validation of the tool for its user tests with inputs from Oticon, EBU TV Summit and Peter Looms (DR) has a meeting with DTG on standardisation issues to do with a roadmap for Application Program Interfaces and access services.
- From October 2008 to June 2009 the Project Coordinator prepared of non-disclosure agreements with NHK (JP) and Media Access Australia (AU).
- On 10 June 2009 the Project Dissemination Manager attended the Text To Speech meeting at DTG, Vauxhall, London.
- Dissemination Manager attended the DTG UK Human Interfaces Subgroup meeting, Vauxhall, London on 3 July 2009
- Dissemination Manager attended the DTG Text-to-Speech task group meeting, Vauxhall, London, 13 August 2009
- Dong-Hi Sim working for ETSI as one of its Technical Officers asked for information on the project in September 2009 and was send the project URL
- Roxana Dunnette a journalist working for UNESCO asked in September 2009 for 3 power point slides on the project which were provided

- In October 2009 P. Looms of DR participated in the Danish Ministry for Science and IT meeting to discuss e-inclusiveness in the light of preliminary results from DTV4All inputs to the Danish national e-inclusiveness strategy by 2011.
- On 16 November 2009 the Project Coordinator attended the Coordinators' day in Brussels.
- The Dissemination Manager attended the DTG Text to Speech Task Group meeting on 18 November 2009.
- The Dissemination Manager participated in the ICT and Ageing meeting 16 December 2009 in Brussels.
- On 7 January 2010 IRT participated in the IPTV subgroup of DVB of the Commercial Module in Geneva at the EBU headquarters.
- 19 January an article in SatNews on the work of DTV4All http://www.satnews.de/mlesen.php?id=7bb37b899a7c0d08012e0b3313f6f64f
- The Dissemination Manager attended the consultation meeting on ICT and Ageing 15-16 February 2010.
- The DTV4All questionnaire for the UK was placed on the Royal National Institute for the Deaf (RNID) website see: https://rnid.wufoo.com/forms/what-are-your-views-on-tv-subtitling/
- The RNID has published its DTV4All results from the questionnaire on its website see: http://www.rnid.org.uk/howyoucanhelp/join_rnid/_member_community/volunteering_campaigning/volunteering_campaigning_news/eu_funded_subtitling_survey_results.htm and http://www.rnid.org.uk/VirtualContent/96626/What_do_you_think_of_subtitles_on_TV___Feb26.pdf
- Expert workshop on monitoring e-accessibility in Europe, 10 June 2010, Brussels, DTV4All was represented by the Project Coordinator
- The Dissemination Manager participated in the DTG Usability group meeting, London, 16 December 2010 on behalf of DTV4All
- The Dissemination Manager participated in the DTG Usability Group meeting, London, 27 January 2011 on behalf of DTV4All
- 7 February 2011 the Project Coordinator gave a presentation on 'Possible short and long-term roadmaps for the roll out of access services in Digital TV across Europe', and Bettina Heidkamp-Tchegloff gave a presentation of RBB's DTV4All test results at the EC Concertation Meeting on DTV, with EC-funded projects on ICT for Inclusion, held at Fraunhofer FOKUS HQ in Berlin
- 11 February 2011 the Project Coordinator gave a participated in the PSP Call 2011 Information Day, Brussels (Belgium)

- 31 March 2011 the Dissemination Manager provided text on DTV4All to the UK Foundation for Assistive Technology (FAST) project for inclusion in its Annual Parliamentary Report. The UK Department of Health has a statutory requirement to produce such a report (pursuant to Section 22 of the 1970 Chronically Sick and Disabled Persons Act) and the FAST report documents the projects funded by the UK government and by the EU and gives active links through to the project information that is regularly updated on the FAST database.