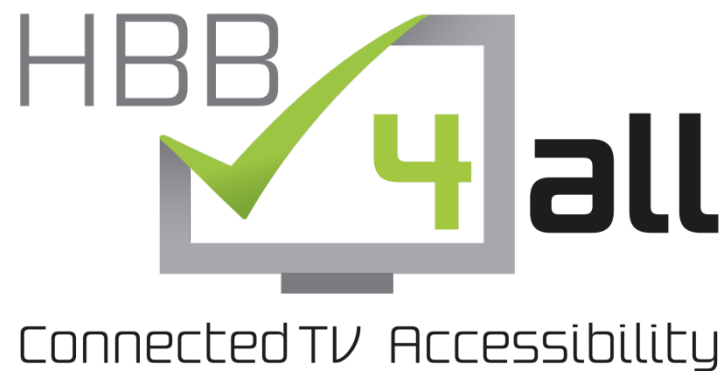


## Hybrid Broadcast Broadband for ALL



**Project no. 621014**

**HBB4ALL**

Hybrid Broadcast Broadband for All

Project Overview

Input Document for the Advisory Board

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## Hybrid Broadcast Broadband for All

### I. The project HBB4ALL

The HBB4ALL (Hybrid Broadcast Broadband for All) is a European project, co-funded by the European Commission under the Competitiveness and Innovation Framework Program (CIP) and by 12 partners from several complementary fields: universities, TV channels/broadcasters, research institutes, and SMEs; all are experts in the field of media accessibility and the multi-device environment. The project started in December 2013 and runs for 36 months.

HBB4ALL addresses media accessibility for all citizens in the connected TV environment. One of the challenges in the coming years will be the delivery of multi-platform audiovisual content (anytime, anywhere, any device) and making this content accessible for all. How can these new services be made accessible and, in turn, how can existing accessibility services be improved by the new technological options? Customizing accessibility services through options for personal preferences is only one example of future possibilities. HBB4ALL addresses these issues, making use of HbbTV (Hybrid Broadcast Broadband TV, a European standard increasingly adopted by European broadcasters) as one of the technical foundations.

### II. The Partners

The consortium includes 12 European partners, 2 of which are academic institutions (UAB, UPM), 4 broadcasters (RBB, RTP, TVC, SWISS TXT), 2 research institutes (IRT, Vicomtech) and 4 SMEs (Vsonix, Screen, PPG, HC), all experts in the field of accessibility.

#### 2 Academic Institutions

The HBB4ALL project coordinator **Universitat Autònoma de Barcelona (UAB)** plays a leading role in scientific research in Spain. It was selected in the top 5 universities to reach the label of Campus of International Excellence from the Spanish government. UAB participates in the project via the Research **Center for Ambient Intelligence and Accessibility of Catalonia (CAIAC)** from the Engineering School and Translation Studies Department. Created in July 2010, it comprises 60 members, it aims to understand and analyze human reaction through perception and cognition research. The UAB team is multidisciplinary with experts from the field of engineering, psychology and audiovisual translation.

**Universidad Politécnica de Madrid (UPM)**, Spain's oldest and largest technical university, has participated in more than 130 European R&D projects over the past four years. The research centre for HBB4ALL collaboration in UPM is the Telecommunication Engineering School (E.T.S. Ingenieros de Telecomunicación) ETSIT-UPM, through the research group "Visual Telecommunication Application Group" (G@TV), which has experience in multimedia modelling, digital image processing, accessibility, design and implementation of transmission channels and video communications. G@TV is in charge of the Indra-Fundación Adecco Chair for the accessible technologies, which aims the audiovisual accessibility and the work integration of people with disabilities.

4 Public Broadcasters	<p><b>RBB</b> is the public broadcaster for the federal states of Berlin and Brandenburg and part of the ARD (Association of Public Service Broadcasting Corporations) in Germany. It produces and broadcasts one television channel and six radio stations and provides interactive services including websites, mobile, teletext and HbbTV-based connected TV services. RBB has longstanding experience in EC co-funded research projects, gaining extensive knowledge in the creation of innovative formats and services, in content production, distribution and user experience testing of services. Recent activities concentrated on accessibility services, collaborative content production, personalized media, and especially the future of HbbTV - also in the context of improved accessibility for hearing and sight impaired people.</p>
	<p><b>RTP</b> is the Portuguese public radio and television broadcaster, the oldest and largest media enterprise in Portugal. HbbTV services are operational on an experimental basis. RTP has internationally-recognised experience in the planning and implementation of television accessibility, not just access services but also a broad interpretation of accessible media developed for and with persons with disabilities. RTP's professional network in TV accessibility policy, regulation and standardization wants to ensure the take-up of media accessibility not only in Europe but also in territories that make use of European standards (DVB, HbbTV among others).</p>
	<p><b>TVC</b> is a Spanish Catalan public broadcaster with long standing experience both in research projects (DTV4ALL, TV-RING) and industrial applications in digital DVB-T broadcasting, interactive online applications, IPTV HbbTV applications (of which TV-RING is a prime example), mobile apps, subtitle management, generation, broadcasting and online publishing.</p>
	<p><b>SWISS TXT</b> is a company of the public broadcaster SRG/SSR in Switzerland and provides a vast variety of services to the broadcaster and other third party customers. One of its sectors is subtitling where SWISS TXT supplies more than 24'000 hours of subtitling per year in three languages (German, French and Italian) on seven TV channels. SWISS TXT wants to optimize - through the HBB4ALL project - the integration of access services of a broadcaster (subtitling, signed programs and audiodescription) into the service at reasonable cost.</p>
2 Research Institutes	<p><b>IRT</b> is a specialized, non-profit broadcast and multimedia technology institute, entirely and jointly owned by the Public Service Broadcasters of Germany, Austria and Switzerland (ARD, ZDF, DRadio, ORF and SRG/SSR). IRT strongly favours open technical standards and horizontal system markets. Consequently, IRT is heavily involved in the technical work of the EBU (the European Broadcasting Union) and is an active contributor to the relevant standardisation bodies and initiatives, from WorldDMB to HbbTV, and from ETSI to ITU.</p>
	<p><b>Vicomtech (VIC)</b> is an applied research centre for Interactive Computer Graphics and Multimedia located in San Sebastian (Spain). It is a non-profit association, founded in 2001 as a joint venture by the INI-GraphicsNet Foundation and the EITB Broadcasting Group. The role of VIC in the market is to supply the society with technology by transfer of primary research to industry. This is done through collaborative R&amp;D projects. VIC's main research lines lay in the fields of multimedia, computer graphics and interaction. VIC's Human Speech and Language Technologies (HSLT) Group and The Interactive Media Technologies (IMT) Group will be participating in the project.</p>

**Vsonix** was founded in 2007 by a team of senior researchers of Fraunhofer IGD (Germany), one of the biggest research institutions for applied visual computing world-wide. The company's long term research expertise includes state-of-the-art technologies within different areas of networked media ranging from interactive and immersive video, multimedia analysis as well as object detection and tracking for augmented reality enabled applications. vsonix aims at the exploitation of actual research in visual computing to provide innovative media services and applications for web based and mobile platforms.

**Screen Subtitling Systems**, based in the UK, started life back in 1976 as Screen Electronics and pioneered and launched the first ever electronic subtitling system, providing the first digital character generator to the BBC. As one of the market leaders, Screen specialises in developing products for the preparation and delivery of subtitling and value-add information services across multiple platforms and devices including HbbTV and Smart TV platforms. Screen's major customers in the worldwide broadcast market include broadcast networks, content producers and service companies. Screen have consistently innovated world-leading systems to reduce production costs and increase transmission reliability and capability.

**People's Playground (PPG)** is based in Amsterdam (Netherlands, NL) and was founded in 2010, on firm background experience in web software development, i.e. video/media streaming and backend technology. The last three years PPG has been involved in several Connected TV and HbbTV R&D projects for various clients, e.g. NPO's (and NL's first) HbbTV catch-up service portal "NPO Uitzending Gemist". PPG is a member of the Dutch HbbTV forum which aims to set the standards for nation-wide implementation of HbbTV within the Netherlands. PPG is member in the ICT PSP CIP project TV RING.

**Holken Consultants & Partners** (France) is specialising in b-to-b market research and strategic & marketing oriented business consulting, operate in connected creative, cultural and media industries and IT markets. Their missions anticipate new content & services related business models in emerging and digital markets. Besides business intelligence and dissemination activities, the company organizes colloquia and conferences in the cross and trans media field, as well as social innovation events. It launched recently the Media4D initiative (in 2012), a high level event about accessibility and media.

### III. HBB4ALL Objectives and targets

One of the challenges of the coming years for European broadcasters will be multi-platform delivery of TV content on broadcast, IP and hybrid delivery platforms (i.e. both big screen, hybrid and two-screen solutions). The introduction of the HbbTV standard helps to overcome the fragmentation of the connected TV market. HbbTV provides a straight-forward specification on how to combine broadcast and broadband content plus interactive applications. TV content can be enhanced with additional synchronised services in a customised manner. Currently, HbbTV 1.1 compliant devices are available in the market; the development of HbbTV 2.0 is ongoing.

For access services HbbTV opens an entirely new opportunity for users who may choose an access service delivered via their IP connection, which then seamlessly integrates with the regular TV programme. The

elderly and people with various disabilities rely on subtitles, audiodescription or sign language. And, in addition, web-based and HbbTV-based solutions offer the potential for customisable services where the user can adapt these to her or his special needs, abilities or preferences.

The project aims to:

- ⇒ Advance solutions for improved accessibility to media, both utilizing and supporting the successful uptake of HbbTV throughout Europe;
- ⇒ Deploy pilot services and validate these in at least three European countries in the context of four different thematic pilots;
- ⇒ Perform expert testing of novel workflows or components thereof for the production of accessibility services at European broadcasters;
- ⇒ Evaluate interoperability in a multi-platform environment including also multilingual aspects to test easy solutions for media accessibility;
- ⇒ Benchmark the quality of access services from a user-centric approach and promote accessibility as an added value for education and social inclusion;
- ⇒ Become a major platform in the e-Inclusion economy currently taking place, influencing the economy, and possibly fostering the future market take-up of existing innovations in conceiving universal accessibility tools and concepts to satisfy the diverse interests of all societal groups.

In its complementary large scale user testing pilots (lab conditions) on quality metrics the project will examine the delivery of accessibility services such as subtitles for the deaf and hard of hearing, audio subtitles, audio description, clean audio, and many customizable features to hybrid TV, PC, tablet or smartphone. Multiple EU languages, large and small, font size, sign language, and language situation – monolingual, bilingual – will be taken into consideration as well as the three translation modes: dubbing, subtitling, and voice-over. Both quality and quantity metrics will be addressed in a user-centric approach.

The project will identify improvements to existing access services and ways of addressing the key technical, organisational and legal obstacles to the sustainable take-up of these services throughout Europe. Being an ETSI (European Telecommunications Standards Institute) standard, HbbTV is currently linked with the DVB TV (Digital Video Broadcasting) system family but can, in principle, be used in conjunction with any digital TV service in the world. DVB is widely used throughout all continents. Sooner or later, all countries in the world will have completed their analogue-to-digital switchover. As a consequence, the results of HBB4ALL will be of worldwide relevance and will, through standardisation bodies such as the ITU (International Telecommunication Union) and ISO, also be publicised on a worldwide level. To transform the accessibility vision into reality, Hbb4All targets all relevant stakeholders and all components of the value chain.

## **IV. HBB4ALL Methodology and Pilots**

The objective of HBB4ALL is to foster wider availability of accessible media content to everybody. The project aims at making cross-platform production and distribution of accessibility features more cost-efficient and yet more flexible and also easier to use.

The methodology of the project foresees user-centric design tests in lab conditions which have already started and whose results will be fed into the four thematic service pilots. Thus “realistic service test deployments”, the pilots, are being prepared in user tests under lab conditions. Work on each of these

pilots has already started with a 20 months “Definition and Preparation Phase”, flanked by a dedicated “Solution and Integration” Task which tackles the technical issues. From August 2015 the Pilots will then be deployed for six months in the space of a one year “Operational Phase”. There, user feedback from the respective target groups will be collected to assess the acceptance and the achievable quality of service in the different delivery scenarios (broadcasting, hybrid, full IP) that take into account the four interlinked pilots.

The four interlinked Pilots are:

### **a) Pilot-A: Multi-platform Subtitle Services**

Across Europe, broadcasters are working to provide subtitles on multiple platforms for individuals who are deaf and hard-of-hearing, or do not have sufficient language skills to understand the content without textual support either in the original or foreign languages. The main challenge is to provide subtitles tailored to the specific needs of the end-users in terms of channels, platforms and consumption requirements. This requires a well-conceived production and distribution strategy that allows for the exchange of subtitles and their automatic re-purposing producing quality and impact-driven access services for multiple platforms.

The four core objectives of this sub-pilot respond to the above chances and challenges which will be tackled in large scale trials in Portugal, Germany and Spain, and partly also in Switzerland.

Pilot-A objectives:

- ✓ A prototypical subtitle production workflow chain for multi-platform purpose for broadcasters which enables basic (HbbTV1.1/1.5) and potentially advanced (HbbTV2.0) customized HbbTV subtitling services aligned with existing subtitling services and integrates broadcast news transcription systems for automatic subtitling and subtitle translation.
- ✓ HbbTV-based Video on Demand (VoD) services allowing users to choose through an application to add subtitles and to customize them for large scale provision and testing in Portugal, Germany (Berlin-Brandenburg), and Spain (Catalonia).
- ✓ An HbbTV-based News service allowing users to access live content automatically subtitled and translated to multiple languages for testing in Spain (Catalonia).
- ✓ Complementary experience testing under lab conditions of related aspects of subtitling in the hybrid and IP-world involving users from the target groups, which will deliver metrics for Quality of Service and prepare the Pilots as described above.

### **b) Pilot-B: Alternative audio production and distribution**

Given EU citizen mobility, TV content is not only seen by nationals, but also by large communities living away from home. There is also a need to broadcast the same content in different languages synchronically (e.g. Swiss TV or Brussels TV) but the content is not the same across languages. Especially for hearing-impaired people the dialog intelligibility of TV audio signals is a key criterion. Also people with vision disabilities can be supported by an additional audio channel, containing a description of the action mixed with the dialogue.

Pilot-B objectives:

- ✓ The three core objectives of this sub-pilot respond to the above chances and challenges which will be tackled in large scale trials in Germany and Spain.
- ✓ Personalized Clean Audio service via IP for certain groups (specifically hard of hearing).
- ✓ Automatically generated speech synthesis of audio description and spoken subtitles.
- ✓ Additional audio channels via IP as resources for multi-language transmission as well as language learning and acquisition.

**c) Pilot-C: Automatic UI adaptation – accessible Smart TV applications**

During the last years digital TV as a media platform has increasingly turned from a simple receiver and presenter of broadcast signals to an interactive and personalised media terminal with access to traditional broadcast as well as web-based services. The accessibility features of such a service will make use of the UI adaptation framework that was developed within the European project GUIDE (Gentle user interfaces for elderly people).

Pilot-C Objectives:

The four core objectives of this sub-pilot respond to the above challenges, which will be tackled in user trials conducted in Germany and Spain.

- ✓ Realisation of a web based User Interface (UI) adaptation and personalisation service based on the framework provided by the European ICT project GUIDE. The service will include functions for user management, profiling as well as the necessary mechanisms for UI and subtitle adaptation. The accessibility service can be used by web application for PC and mobile as well as HBBTV 2.0 based applications to integrate accessibility features such as personalized UI rendering.
- ✓ Provision of a user testing and profiling application as part of the web based UI adaptation service. This application will be an essential part of the accessibility service and will allow determining user requirements and preferences based on a number of accessibility tests.
- ✓ Provision of different ConnectedTV services running on HbbTV 1.5 and HBBTV 2.0 platforms targeting elderly people as their main user group. Those services will include a tele-learning service for life-long learning as well as an interactive service. The accessibility features of these services will benefit from the targeted UI personalisation and adaptation service.
- ✓ Complementary user experience testing of different end user related aspects of UI adaptation in the Connected TV world involving users from the target groups, which will deliver metrics for Quality of Service done by UAB.

**d) Pilot-D: Sign-language translation service**

Visual signing for audiovisual media makes such content accessible to individuals whose mother tongue is a sign language and not a written language. In many European countries, constitutional and legal provisions assure the availability of sign language on TV. Signing is important not only for mainstream programming and TV programming specifically for the signing communities in Europe and elsewhere but also emergency alerts on TV.

Pilot D objectives:

The four core objectives of this sub-pilot respond to the above challenges:



- ✓ A prototype version of a complete sign language interpretation production workflow chain for broadcasters, which enables basic (HbbTV1.1/1.5) and advanced (HbbTV2.0) customised HbbTV and web-based sign language services.
- ✓ Hbb/IP TV-based sign language services allowing users to customise the size and positioning of sign language interpretation in an overlaid window for large-scale provision and testing in Portugal and Germany (Berlin-Brandenburg), depending on the technological capabilities and on the available equipment.
- ✓ An HbbTV-based avatar signing service in Spanish allowing users to access Text-to-Signing for content with a well-defined semantic framework such as weather forecasts. This service will be tested by means of user groups.
- ✓ Additional non technological user experience testing of various end user-related aspects of sign language interpretation, which will involve users from the target groups, may be considered. These tests will provide inputs to work on metrics for the Quality of Service.

## V. Targets Outcomes

The project HBB4ALL and its pilots' results are central and important to the realisation of the societal and economic objectives of the Digital Agenda for Europe.

Public service broadcasters and their partners traditionally demonstrate “proof-of-concept” for initiatives like e-inclusion. Working together or via the European Broadcasting Union (EBU) they can demonstrate mature solutions developed with and for persons with disabilities.

Given the impact in close fields such as eHealth and eEducation for example, the results from this project will have important results and direct impact. The services piloted can then be adopted and scaled up across Europe in tandem with the household penetration of ‘connected TVs’ using HbbTV forecasted to pass the 50% mark in Europe in 2016. Very few commercial broadcasters currently have the wherewithal (means) to do this kind of work, hence the need for a pan European initiative.