

## Deliverable 7.3.1

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## **Executive Summary**

This document presents all dissemination and exploitation activities performed by HBB-NEXT. The project can look back on manifold activities in this area. It has been present at 30 events (conferences, workshops) with 47 HBB-NEXT related presentations (section 3.2). It has published 24 scientific publications (section 3.5) and 29 news articles via its website (section 3.6) which has been constantly improved and adapted after its early creation. The project has organised six dedicated HBB-NEXT events (section 3.2 and 3.3) and plans more events for reporting period 2. HBB-NEXT knowledge was transferred to 9 master courses and 9 PhD theses (section 5). A logo, a flyer plus special inlay, a poster and a presentation template are available (section 3.7) and the project is visible in social networks. It has also been present with a successful first showcase both at IFA and IBC 2012 (section 3.2).

The consortium has followed a very systematic dissemination approach monitored via an online collaboration tool (excel table), which is constantly updated by all partners and managed by RBB and STUBA. The project has also been very active in concertation, 10 dedicated activities in this area are listed in section 3.8 of this document.

Exploitation activities have been planned and started. However, they will move stronger to the focus in the future – only now first concrete project results start becoming available.

For the first months of the project strand one of the HBB-NEXT dissemination strategy was more in the focus. This strand is about general promotion to create a public awareness of the existence and basic objectives of HBB-NEXT. However, dissemination strand 2, more specific dissemination effort both towards the scientific community and industrial stakeholders, has already successfully started. For year two, now that first results are available, this strand will be strengthened. Concrete plans are already under way: the project plans another dedicated HBB-NEXT event and also a project presentation with an own booth at IBC 2013 and also a second demo at IFA 2013. We will also try to be present with a dedicated joint HBB-NEXT contribution at some important conferences.

### 1. Introduction

This document summarises all dissemination activities that were undertaken during the first reporting period of HBB-NEXT. After one year dissemination has evolved into a strong strand of the project. We can illustrate this by the following numbers:

The HBB-NEXT team has:

- given 47 dedicated HBB-NEXT presentations at 29 events. This is about one presentation per working week on average
- published 24 scientific publications
- published 29 news articles on its website [www.hbb-next.eu](http://www.hbb-next.eu); each of these articles was simultaneously communicated via Twitter (<https://twitter.com/hbbnext>) and Facebook (<https://www.facebook.com/HBBNEXT>)
- organised six dedicated HBB-NEXT events
- transferred HBB-NEXT knowledge to nine master courses and nine PhD theses

Deliverable D7.2, Dissemination and Standardisation Strategy, proved very helpful in shaping these activities. Furthermore, the central instrument for implementing this strategy was really effective for planning and coordinating our dissemination activities. It is an Excel table which was created by RBB and STUBA and which is being managed via the HBB-NEXT online collaboration tool Redmine by both RBB and STUBA. This table provides a detailed overview of past and planned Dissemination Events, Exploitation Activities, Standardisation Events, Publications, and Dissemination Materials. It also includes an Editorial Calendar for Website and Social Media Activities. The timeline on the Editorial Calendar is used by RBB for keeping the website up-to-date and asking partners for their input. Each partner is asked to update the table regularly to ensure transparency.

The document is organised as follows: Section 2 offers a short recap of the HBB-NEXT dissemination strategy as it was detailed in Deliverable D7.2. Section 3 presents all dissemination activities along the different activity strands, including events, publications, website, materials and concertation. Section 4 starts with a short re-cap of the exploitation strategy and then gives a summary of exploitation activities performed so far.

## 2. Short re-cap of HBB-NEXT Dissemination Strategy

Our dissemination strategy differentiates the two different strands “general promotion” and “more specific promotion”. General promotion targets creating awareness on the existence of the project as such, to the broader public and the scientific community. Year one first focused on this general promotion. Increasingly, this also includes promoting our early results and not only our aims. General promotion included creating the website and basic dissemination materials, being present at events and fairs, and also creating internal promotion in each partners’ organisations and larger networks.

The second strand is more specific promotion in creating awareness via the scientific and professional networks of each partner. Even though this strand becomes increasingly important the further the project proceeds and results become available. Basically, this concerns the participation in seminars, workshops and conferences, including presentations and the publication of scientific journal and conference papers. With 25 scientific papers this strand has been taken up very successfully. It also includes more specific promotion and discussion of project results towards the stakeholders of the broadcasting/service provider sector and CE industry. Good examples for this are the first TNO Feedback workshop with people from the Dutch media industry on 20 March 2012 and our successful presentations at IBC (IRT) and IFA (RBB and IRT).

The crucial tool for implementing the strategy outlined in D7.2 is an Excel table which was created by RBB and STUBA and which is being managed via the HBB-NEXT online collaboration tool Redmine. This table provides a detailed overview of past and planned Dissemination events, Exploitation Activities, Standardisation events, Publications, Dissemination Materials. It also includes an Editorial Calendar for Website and Social Media Activities along a timeline. The latter is used by RBB for keeping the website updated and asking partners for their regular input. Each partner is asked to update the table regularly to ensure transparency.

### **3. Dissemination Activities**

#### **3.1 Event Related Activities - Overview**

Presentations at relevant specific events such as conferences, symposia, workshops, standardisation organisation meetings and other event-related activities form the heart of the HBB-NEXT dissemination strategy. They are ideal for addressing industry, academia and special interest groups in a focused way. After year one of the project, the HBB-NEXT consortium can look back on a significant number of presentations at numerous events. The presentations are listed one by one below.

#### **3.2 List of Event Related Activities**

##### **3rd International ngnlab.eu workshop on NGN - 02.11.2011**

At the "3rd International ngnlab.eu workshop on NGN" [1] in Delft, Netherlands (02.11.2011) two presentations promoting HBB-NEXT were given: Eugen Mikóczy (ST) spoke on "NGN based IPTV" and Oskar van Deventer (TNO) on "Content Delivery Networks and their interconnection".

##### **Kick-off meeting of HbbTV/Netherlands - 07.11.2011**

Rob Koenen of TNO promoted HBB-NEXT in the context of the Kick-off Meeting of HbbTV in Hilversum, Netherlands on 7.11.2011.

##### **Workshop on Brazil-EU cooperation in ICT R&D - 07.11.2011**

On 7.11.2011 HBB-NEXT was presented at the annual "Information and Communication Technologies (ICT) dialogue" [2] in Brasilia, Brazil. HBB-NEXT was introduced by Dr. Klaus Illgner-Fehns of IRT. He also presented the HbbTV Standardisation Consortium, which he presides. At the workshop in Brasilia, the European Commission and the Brazilian Government agreed to launch a new coordinated call for research and development proposals with €10 million available in funding. This call for proposals will allow researchers and industries in the two regions to extend their work together into areas such as cloud computing for science, sustainable technologies for smart cities, smart platforms for a smarter society, and hybrid broadcast-broadband TV applications and services.

The Commission and the Brazilian authorities have also agreed to share their respective experience and knowledge of policy and regulatory aspects in the ICT field, such as broadband development, internet governance and security, cloud computing and digital broadcasting and content.

### **Telekom Day - 10.11.2011**

The presentation “HBB-NEXT as an example of common success” was given by Eugen Mikóczy (ST) at the Telekom Day in Bratislava, Slovakia (10.11.2011).

### **Going Local 2011: Digital Agenda Meeting 3 – Open Mini-Conference: Research and Innovation – infrastructures, opportunities and perspectives in Horizon 2020 and CEF. - 25.11.2011**

HBB-NEXT was one of two projects presented in the Mini-Conference: "Research and Innovation - Opportunities and perspectives (Horizon 2020)" [3]. The project was presented jointly by Gregor Rozinaj (STUBA) and Eugen Mikóczy (ST). The event was organised by the European Commission - DG Information Society and Media in the context of the initiative "Going Local 2011". This effort was started in autumn 2010 by the European Commission - right after the publication of the Digital Agenda.

### **Hybrid Broadcast Broadband TV - 06.12.2011**

Rob Koenen of TNO promoted HBB-NEXT in the context of the Hybrid Broadcast Broadband TV on 7.11.2012 in Hilversum, Netherlands.

### **Presentation of HBB-NEXT to representatives of the Japanese Ministry of Internal Affairs and Communications (MIC) - 02.02.2012**

On 2 February 2012, NEC colleagues in Japan gave a presentation about HBB-NEXT to a few representatives of the Japanese Ministry of Internal Affairs and Communications (MIC). The presentation aimed at disseminating some of the European R&D activities in the area of convergence of communications and broadcasting, and multi-terminal challenges. The request was triggered by the MIC to the NEC colleagues in Japan. Daniele Abbadessa prepared a presentation and briefed his colleagues in Japan.

### **IP&TV World Forum - Session: TV on the move-taking the tablet - 22.03.2012**

The HBB-NEXT vision “Tailoring and Synchronising HbbTV with Multiple Second Screens” was presented by Oskar van Deventer (TNO) at the IP&TV World Forum [4] in London. After a short introduction on HbbTV, he highlighted how several people together in one room could share a TV experience: the content would be interactive and also synchronized on multiple devices. This particular group – a family or a friend – would also receive recommendations tailored to their needs and interests.

Oskar van Deventer also presented the first results of user experiments carried out by HBB-NEXT partner KU Leuven: The focus of the investigation a comparison of the user interaction via gesture, speech and remote control of a media centre (Internet-enabled TV). The question from the audience was “when can we have this?”



Figure 1: Oskar van Deventer at the IP&TV World Forum - 22.03.12

#### 6th International Workshop (REDŽUR 2012) - 11.04.2012

Student members of the STUBA HBB-NEXT research team presented first research results of HBB-NEXT at the "6th International Workshop on Multimedia and Signal Processing Redžúr [r E d Z U: r]" [5]. The workshop in Vienna, Austria was organized by HBB-NEXT partner STUBA (Gregor Rozinaj). It focused mainly on scientific papers of students and young scientists on HBB-NEXT related topics like speech synthesis or gesture recognition. The students presented eight papers within a poster session about multimodal interface developments.





*Figure 2: Presentation of REDŽUR poster session*

**19th International Conference on Systems, Signals and Image Processing, (IWSSIP 2012) - 11.-13.04.2012**

HBB-NEXT developments were part of the "19th International Conference on Systems Signals and Image Processing IWSSIP 2012" [6] that took place from April 11th - 14th, 2012 in Vienna, Austria. Here, Matus Vasek from project partner STUBA presented the contribution of the HBB-NEXT research team on a speech synthesis module, which is being developed within the Multimodal Interface work of HBB-NEXT. This year's conference in Austria is the latest event in a successful series of IWSSIP conferences. While IWSSIP started off as a European conference it has attracted a lot of interest over the years and has been evolving into a world conference with participants from all continents. From HBB-NEXT Pavol Podhradský and Gregor Rozinaj (STUBA) are members of the International Programme Committee of IWSSIP.

**Open University day – 16.05.2012 (STUBA University Bratislava)**

An Open University Day took place at the Institute of Telecommunication, Faculty of Electrical Engineering and Information Technology of STUBA (FEI STUBA). The general objectives and expected outputs of the HBB-NEXT project, as well as the current research results of the STUBA project team were presented. The demos focused on user identification (based on speech recognition, face recognition). The target group: FEI STUBA MSc and Bc students. At the same time selected groups of MSc students presented their projects, e.g. "Gesture navigation for e-mail", "Speakident".

**11th IFIP Networking 2012 Conference: "Future Multimedia Content and Services Delivery" - 21.05.2012**

At this year's IFIP [7], Eugen Mikóczy (ST) and Ivan Kotuliak (STUBA) gave the tutorial „Future Multimedia Content and Services Delivery: Hybrid Broadcast-Broadband, Managed IP or Unmanaged Internet“. Here, different multimedia delivery models, technologies and actual trends were analysed. The presentation included an introduction to HBB-NEXT and its user scenarios that have been adapted by ETSI MCD in the context of multi-screen services. The day was concluded with looking at trends in the evolution of multimedia content and service delivery; especially in the context of the current discussion on the role of media delivery in Future Networks. The "11th IFIP Networking 2012 conference" was hosted by Czech Technical University in Prague.



*Figure 3: Ivan Kotuliak (STUBA) at 11th IFIP Networking 2012 Conference – 21.05.2012*

**Open House Day at THM - 23.06.2012**

HBB-NEXT's latest research results were presented at THM's Media and Telecommunications Lab when the university had its Open House Day on 23.6.2012. The presentation covered not only general aspects of the project and THM's specific research focus but also the evolution of digital TV and the meaning of HBB-NEXT in this process: from analogue to digital, from HbbTV to HBB-NEXT. The presentation aimed at presenting the project offering an innovative pool of future TV features. Most visitors were no scientists but rather an interested public using digital media in everyday life. The general feedback to HBB-NEXT was very positive, and the lively discussion after the presentation offered the chance to ask which features the visitors might like to see in the future.

Those present were wondering when tablets, smartphones, TVs and apps might be able to handle features like synchronization, group recommendations and social TV in distributed locations and via different platforms.



*Figure 4: THM presents HBB-NEXT's latest research results within the University Open House Day - 23.6.12*

#### **World Conference on Educational Multimedia, Hypermedia and Telecommunications 2012 - 26-28.6.2012**

Tomas Kovacik, Roman Bronis, Ivan Kotuliak and Peter Truchly (all STUBA) presented a paper titled "Innovative Broadcasting Architecture for E-learning Improvement" at international conference ED-MEDIA 2012 [8], 26-28.6.2012, Denver, USA. As educational institution, STUBA team members proposed the usage of broadcasting technologies to improve educational process. Based on existing standards of Hybrid Broadband Broadcast TV the article describes the STUBA laboratory environment along with new developed applications that will serve as basis for HBB-NEXT development, new modalities and additional features. Innovation in the project is represented by transmission of educational content via DVB-T broadcast channel to wide audience (e-learning) and possibility of managing and taking exams over back IP channel. Thus, a hybrid approach is utilized.

#### **EuroITV 2012 - 10th European Interactive TV Conference "Bridging People, Places & Platforms" - 04.-06.07.12 [9]**

Sachin Agarwal of NEC presented a poster on TV for a Billion Interactive Screens: Cloud-based Head-ends for Media Processing and Application Delivery to Mobile Devices directly linked to NEC's research in work package 3 of HBB-NEXT.

At the 3rd International Workshop on Future Interactive Television organized by HBB-NEXT's partner project LinkedTV, Jeroen Vanattenhoven from KU Leuven, also partner in HBB-NEXT, spoke on user research. He presented a diary and interview study which was conducted in work package 2 of HBB-NEXT, exploring 2nd Screen usage in Belgian households. A report of this study can be accessed in D6.2.

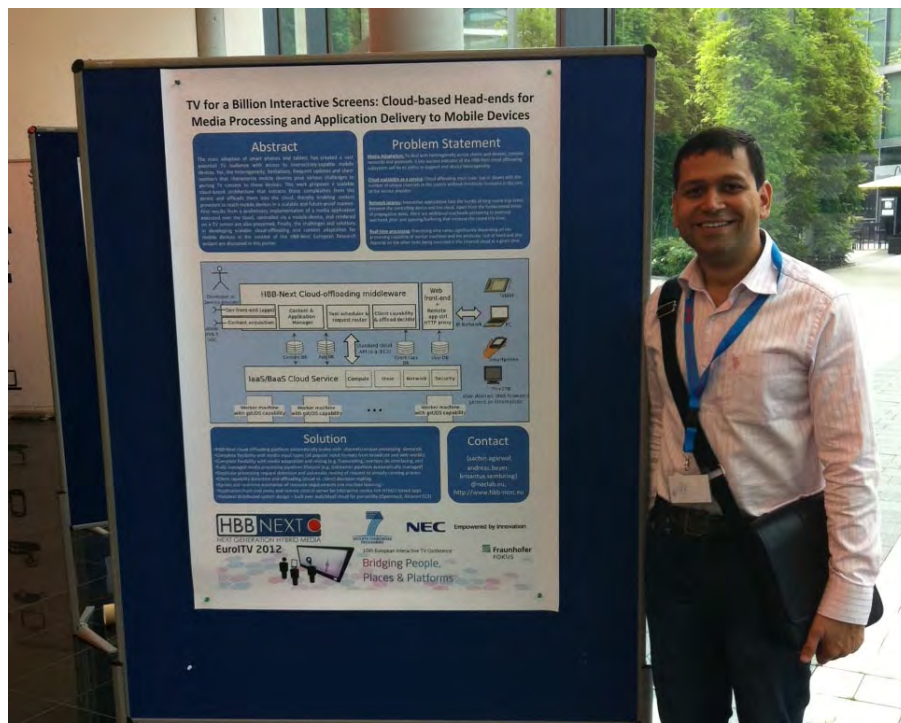


Figure 5: Sachin Agarwal (NEC) presenting a poster at EuroITV – 04.07.12

#### Internationale Funkausstellung/International Broadcasting Exhibition (IFA) - 31.08.-05.09.12

HBB-NEXT was featured at the International Broadcasting Exhibition IFA [10], which took place in Berlin from 31.8 till 5.9.12. Project partners RBB and IRT showed their work package 4 related showcase for access to synchronised hybrid services ("Digitale Welt/Digital Worlds", Hall 2.2) and got very positive feedback from the broadcasting world. The HBB-NEXT IFA showcase demonstrates how users can adjust HbbTV based TV services to suit their own needs. Demonstrating subtitles and signer videos for barrier-free access to television, the new application not only bundles access to these services via a central launcher application but also offers the user personalisation options such as adjustable font size, position or background settings. User tests conducted by RBB indicated the need for such options. Not only HbbTV subtitles or sign language interpreter videos but other services could be bundled via the launcher application and adjusted by users according to their individual needs. The IFA application is currently being integrated with the synchronisation solution of HBB-NEXT partner THM.



This allows for the complex synchronisation of broadcast (TV) and IP content (subtitles, signer video). To achieve this, the HbbTV functionality was extended by THM to synchronize DVB services with IP videos (e.g. MPEG-DASH) and Internet metadata (e.g. subtitles) using a timeline.



*Figure 6: Janina Renz (IRT) in front of the HBB-NEXT demo*



*Figure 7 Bettina Heidkamp-Tchegloff (RBB) and Janina Renz (IRT) demonstrating the application to ARD officials*



*Figure 8: Bettina Heidkamp-Tchegloff (RBB) presenting in an extra daily show at IFA*

**Presenting HBB-NEXT at the IEEE International Conference on Consumer Electronics - Berlin (ICCE-Berlin 2012) - 03.-05.9.2012**

The paper “A DVB/IP Streaming Testbed for Hybrid Digital Media Content Synchronization” at this year’s IEEE International Conference on Consumer Electronics (ICCE 2012) [11] was presented by Christian Köbel of the University of Applied Sciences THM. The "European" ICCE edition is the annual magnet for international researchers in the fields of consumer electronics and digital media entertainment. The conference is co-located with the IFA 2012 fair, which makes it the perfect spot to discuss the latest HbbTV findings. The paper highlighted the recent results of work package 4: The testbed presented here enables absolute timecode values to be broadcasted along with regular DVB content. Providing absolute timing information on the client side allows to easily play-out all kinds of auxiliary digital audio/video streams synchronously. The testbed features a DVB stream and an MPEG-DASH video, which are played out lip-synched in a picture-in-picture fashion. Inter-media synchronization depicts the first technical milestone on synchronization services in HBB-NEXT. Among other novel technical contributions by work package partners, the demonstrator is described in Deliverable D4.2, which will be featured on this website (document section) soon.



*Figure 9: Christian Köbel (THM) presenting “A DVB/IP Streaming Testbed for Hybrid Digital Media Content Synchronization”*

#### **IBC 2012 – Amsterdam - 07.-11.09.2012**

Following the successful IFA Demo, IRT presented the work package 4 related showcase for customised and synchronised HbbTV services (for example: accessibility services) also at their booth at IBC [12]. About 200 visitors attended the booth and the HBB-NEXT showcase was an interesting contribution in the broader HbbTV context of the current market in Germany and the innovative potential of the standard. Among the visitors were: SRG, Swiss Text, Kabel Deutschland, Telewizja Polska, KBS, YLE, NHK, NBC, Neotion, Open, GloboTV, SBS, EU, Tara Systems, Media Broadcast, BBC, EBU, ZDF, NDR, and BR.





Figure 10: IRT at IBC 2012

#### 54th International Symposium ELMAR 2012 - Zadar - 12.-14.09.2012

The STUBA HBB-NEXT project team participated in the "54th International Symposium ELMAR 2012" (12.09.-14.09.2012 in Zadar, Croatia) [13]. Within three articles (STUBA, ST), published in the symposium proceedings, the following research results were presented:

"Speaker identification system based on a web interface" authors: Kacur Juraj, Lapin Ivan, Durajka Juraj presented new approach of STUBA research in the field of speaker identification. The presentation was held by Juraj Kacur who mentioned new application implemented as the web based speaker identification system, and it's adjustment and evaluation, as well.

"Gesture Identification for System Navigation in 3D Scene", authors Marek Vanco, Ivan Minárik, Gregor Rozinaj presented a method and implementation of hand gesture recognition for operation/navigation in multimedia environment, and its evaluation.

"VoIP Intrusion Detection System with Snort", authors Pavol Číž, Ondrej Lábaj, Pavol Podhradský, Juraj Londák, presenter Juraj Londák has focused on signaling DoS attack. This model will serve as a base during creation, testing and evaluation of security policies in "HBB-NEXT" project enforced by security manager.





Figure 11: Juraj Kačúr (STUBA) presenting "Speaker identification system based on a web interface" at ELMAR 2012 Symposium



Figure 12: Ivan Minárik (STUBA) presenting "Speaker identification system based on a web interface" at ELMAR 2012 Symposium

### 3.3 Dedicated HBB-NEXT Events

Three dedicated HBB-NEXT events were conceived.

#### 3.3.1 Special session "HBB and Smart Room Technologies"

Special session "HBB and Smart Room Technologies" [14] within 5th Joint IFIP Wireless and Mobile Networking conference-WMNC in Bratislava, Slovakia, organised by STUBA, from 19.to 20.9.2012. HBB-NEXT topics and research activities correlate with the thematic orientation of the WMNC 2012 conference. Because of this, STUBA, after discussions with RBB and other HBB-NEXT project partners, decided to organise the Special session "HBB and Smart Room Technologies" within WMNC 2012 conference. The Special Session focused on the following topics of HBB and Smart Room Technologies:

- Hybrid Systems for Broadcast and Broadband Technologies
- Intelligent Communications - Smart Rooms
- Sensor Networks and MIMO Technology for Smart Rooms
- HCI for Advanced Communication Systems
- Multimodal Interface
- Hybrid, IPTV and Smart Room Services
- Evolution Towards Future Networks

Within five presentations, some HBB-NEXT research results have been presented by HBB-NEXT project team in the frame of Special Session: "HBB and Smart Room Technologies":

1. HBB-NEXT in the context of HbbTV 2.0, RBB (Bettina Heidkamp-Tchegloff), IRT (Michael Probst), invited paper



*Figure 13: Michael Probst (IRT) presenting "HBB-NEXT in the context of HbbTV 2.0" at the Special session "HBB and Smart Room Technologies", STUBA. 20.9.2012*

2. HBB-NEXT: Providing independent content recommendations in a next-generation Hybrid Broadcast Broadband TV ecosystem, TNO (M. Oskar van Deventer, Joost de Wit, Bas Gerrits, IRT (Mark Guelbahar, Michael Probst)
3. Face Recognition Methods for Multimodal Interface, STUBA (Jozef Ban, Jarmila Pavlovičová, Matej Féder, Luboš Omelina, Miloš Oravec). A comparative study of the several face recognition methods for the Next generation HBB TV multimodal interface that are suitable to work in real world conditions. Based on the results the most suitable face recognition methods which fulfil HBB-NEXT project requirements have been selected.



*Figure 14: Jozef Ban and Matej Féder (STUBA) presenting “Face Recognition Methods for Multimodal Interface” at the Special session “HBB and Smart Room Technologies”, STUBA. 20.9.2012*

4. Towards novel HBB application platform: experimental testbed, STUBA (Tomas Kovacik, Roman Bronis, Ivan Kotuliak). Description of laboratory deployment of HBB-NEXT featured environment. Based on existing standards of Hybrid Broadband Broadcast TV the deploy laboratory environment along with new applications enabling personalisation of content and multimodal interface has been deployed.
5. Security challenges in Next generation HBB TV, STUBA (Pavol Podhradský, Juraj Londák, Ondrej Lábaj), ST (Juraj Matejka). Description of various attacks are summarized. The methods focused on the intrusion detection and protection, the tools that manage the trusted use of digital media content, as well as approaches for user’s data privacy are presented in the paper. Within HBB-NEXT architectural concept the Security Manager (SM) architectural component was proposed.





*Figure 15: Juraj Londák (STUBA) presenting "Security challenges in Next generation HBB TV" at the Special session "HBB and Smart Room Technologies", STUBA. 20.9.2012*

### 3.3.2 Media Synchronisation Workshop

Media Synchronisation Workshop took place in Berlin, Germany, 11.11.2012, in conjunction with ICIN 2012 (TNO) [15]. Media synchronization has been a challenge in A/V transmission for quite some time. Over the years, many techniques to achieve intra- and inter-media synchronization in various network conditions have been developed. In many cases, synchronization between different streams of media is crucial for a satisfying perceived Quality of Experience (QoE). Currently, many new media synchronization issues arise. On the one hand, novel media technologies such as HTTP streaming protocols, media encoders and HDTV often require new synchronization techniques. On the other hand, new patterns in media consumption often introduce specific synchronization issues. For example, Internet applications evolving around broadcast TV content may need synchronization between the application and the broadband stream. Synchronization between different TV receivers may be needed in Social TV (inter-destination media synchronization). In some interactive TV cases synchronization between handheld devices and the TV screen may be needed. Moreover novel 3D technologies for TV broadcasting and tele-presence (3D tele-immersion) may require the adoption of several of these synchronization techniques to achieve a satisfying user experience. This workshop addresses various synchronization issues and requests contributions from different perspectives.

The workshop was sponsored by the following projects: FP7 HBB-NEXT, FP7 Reverie. The workshop was organized by TNO ([www.tno.nl](http://www.tno.nl)), CWI ([www.cwi.nl](http://www.cwi.nl)) and UPV ([www.upv.es](http://www.upv.es))

### **3.3.3 MUSST workshop on Multi-User Services for Social TV @ ICEC2012**

"MUSST workshop on Multi-User Services for Social TV @ ICEC2012" took place in Bremen, Germany (THM / KU Leuven/ NEC) from 26. to 29.9.2012. This workshop was prepared on initiative of KU Leuven, assisted by THM and NEC. Unfortunately, much to the organisers regret, the workshop did not receive sufficient submissions and had to be cancelled. For the next EuroITV 2013 Conference (their website is not yet online), we intend to resubmit the (cancelled) MUSST workshop. More information on the topic on the MUSST workshop website which is still online [16]: "The world of consumer devices has undergone drastic changes in the last couple of years, which has also had an impact on the interactive television landscape. While some research is already taking this multi-device context into account, little research has actually addressed the multiple user contexts. Currently, personalisation and recommendation algorithms do not work across devices and do not support a group of users. Group dynamics, such as new users entering or leaving the room are not considered either. As watching TV is often a group experience, this lack impedes service and content providers to introduce personalisation and tailored content recommendations in a Hybrid Broadcast Internet environment."

### 3.4 Overview Table: HBB-NEXT at past and future Events

The table below presents an overview related to the textual descriptions above. Furthermore, it shows the events and conferences at which HBB-NEXT will be represented in the coming months.

Description	Title, Topic	Location	Type	Held by	Responsible partner/s	Date
3rd International ngnlab.eu workshop on NGN	Workshop organisation	Delft, Netherlands	workshop	Oskar van Deventer, Eugen Mikóczy, Ivan Kotuliak	TNO, ST, STUBA	02.11.2011
	NGN based IPTV	Delft, Netherlands	presentation	Eugen Mikóczy	ST	02.11.2011
	Content Delivery Networks and their interconnection	Delft, Netherlands	presentation	Oskar van Deventer	TNO	02.11.2011
Kick-off meeting of HbbTV/Netherlands	HbbTV Vandaag en Morgen	Hilversum, Netherlands	presentation	Rob Koenen	TNO	07.11.2011
Workshop on Brazil-EU cooperation in ICT R&D	HBB-NEXT – Next-Generation Hybrid Media A European FP7 ICT Research Project	Recife, Brasil	presentation	Dr. Klaus Illgner-Fehns	IRT	07.11.2011
Telekom Day	HBB-NEXT as an example of common success	Bratislava, Slovakia	presentation	Eugen Mikóczy	ST	10.11.2011

Description	Title, Topic	Location	Type	Held by	Responsible partner/s	Date
Going Local 2011: Digital Agenda Meeting 3 – Open Mini-Conference: Research and Innovation – infrastructures, opportunities and perspectives in Horizon 2020 and CEF.	HBB-NEXT FP7 Project	Bratislava, Slovakia	presentation	Gregor Rozinaj (Eugen Mikóczy)	STUBA, ST	25.11.2011
Hybrid Broadcast Broadband TV	HbbTV Vandaag en Morgen	Hilversum, Netherlands	presentation	Rob Koenen	TNO	06.12.2011
Networked Media 8th FP7 Concertation Meeting	HBB-NEXT Next Generation hybrid broadcast broadband	Brussels, Belgium	presentation	Bettina Heidkamp-Tchegloff	RBB, IRT	13.-14.12.11
Public Consultation on the FP7 ICT Work Programme 2013 "Networked Media Systems"	Public consultation FP7 ICT Work Programme 2013 Networked Media Sector Objective 1.5	Brussels, Belgium	presentation	Ralf Neudel	RBB, IRT	27.01.2012
Presentation of HBB-NEXT to representants of the Japanese Ministry of Internal Affairs and Communications (MIC)	HBB-NEXT Next Generation hybrid broadcast broadband	Tokyo, Japan	presentation	NEC (prepared by Daniele Abbadessa)	NEC	02.02.2012
First Dutch HBB-NEXT Feedback Workshop	Workshop organisation	Delft, Netherlands	workshop	Bas Gerrits	TNO	19.03.2012
	TNO and HbbTV	Delft, Netherlands	presentation	Nathalie van Schie	TNO	19.03.2012
	HbbTV Netherlands and the HBB-NEXT feedback group	Delft, Netherlands	presentation	Rob Koenen	TNO	19.03.2012
	HBB-NEXT: Tailoring and Synchronising HbbTV with Multiple Second Screens	Delft, Netherlands	presentation	Oskar van Deventer	TNO	19.03.2012
	HBB-NEXT scenarios, use cases and business models	Delft, Netherlands	presentation	Bas Gerrits	TNO	19.03.2012



Description	Title, Topic	Location	Type	Held by	Responsible partner/s	Date
IP&TV World Forum - Session: TV on the move-taking the tablet	HBB-NEXT: Tailoring and Synchronising HbbTV with Multiple Second Screens	London, UK	presentation	Oskar van Deventer (input Jeroen Vanattenhoven & Eugen Mikóczy)	TNO, KUL, ST	22.03.2012
6th International Workshop (REDŽUR 2012)	Workshop organisation	Vienna, Austria	workshop	Gregor Rozinaj, Ivan Minárik, at al.	STUBA, TU Vienna	11.04.2012
	Touchless Computer Control with Hands	Vienna, Austria	presentation	Ľubomír Molčan, Marek Vančo, Ján Tóth	STUBA	11.04.2012
	Speaker Identification Web-Application Based on Java EE Implementing MFCC and KNN dAlgorithms	Vienna, Austria	presentation	I. Lapin, J. Ďurajka, Juraj Kačur	STUBA	11.04.2012
	Speaker Identification	Vienna, Austria	presentation	Matúš Peteja, Juraj Kačur	STUBA	11.04.2012
	Face Recognition of Images Corrupted by Transmission Errors	Vienna, Austria	presentation	Jozef Ban, Matej Féder, Miloš Oravec, Jarmila Pavlovičová	STUBA	11.04.2012
	Impact of discriminative training to improve recognition for MASPER training procedure	Vienna, Austria	presentation	T. Trnovský, Juraj Kačur	STUBA	11.04.2012
	Optimization and implementation of data processing methods for MASPER training procedure	Vienna, Austria	presentation	R. Kožička, Juraj Kačur	STUBA	11.04.2012
	Computer Control with Eyes Pupil Localization	Vienna, Austria	presentation	M, Štofaňák, Ján Tóth, Anna Kondelová	STUBA	11.04.2012
	Modular speech synthesizer in Python	Vienna, Austria	presentation	Matúš Vasek, Gregor Rozinaj	STUBA	11.04.2012
19th International Conference on Systems, Signals and Image Processing, (IWSSIP 2012),	Introduction to Speech Synthesis Management Tools	Vienna, Austria	presentation	Matúš Vasek, Gregor Rozinaj, Anna Kondelová, Ján Tóth	STUBA	11.-13.04.2012

Description	Title, Topic	Location	Type	Held by	Responsible partner/s	Date
11th IFIP Networking 2012 Conference: "Future Multimedia Content and Services Delivery"	Hybrid Broadcast-Broadband, Managed IP or Unmanaged Internet	Prague, Czech Republic	Tutorial	Eugen Mikóczy, Ivan Kotuliak	ST, STUBA	21.05.2012
Open University day	HBB-NEXT project conception and actual results	Friedberg, Germany	presentation	Christopher Köhnen, Christian Köbel, Nils Hellhund, Christian Überall	THM	23.06.2012
Open University day	Multimodal interface demos	Bratislava, Slovakia	presentation (for Bc and MSc students)	Gregor Rozinaj, Juraj Kačúr	STUBA	16.05.2012
Ad-hoc Fascinate HBB-NEXT workshop	Workshop organisation	Munich, Germany	workshop	Omar Niamut, Michael Probst	TNO, IRT	18.06.2012
Ad-hoc Fascinate HBB-NEXT workshop	Media synchronisation for hybrid broadcast broadband content	Munich, Germany	presentation	Arjen Veenhuizen	TNO	18.06.2012
World Conference on Educational Multimedia, Hypermedia and Telecommunications 2012	Innovative Broadcasting Architecture for E-learning Improvement.	Denver, USA	presentation	Tomáš Kovacik, Roman Bronis, Ivan Kotuliak, Peter Trúchly	STUBA	26-28.6.2012
Demo on HBB-NEXT YouTube channel	First multi-user content recommendation prototype	Delft, Netherlands	demo	Joost de Wit	TNO	20.06.2012
EuroITV 2012 - 10th European Interactive TV Conference "Bridging People, Places & Platforms"	Poster on TV for a Billion Interactive Screens: Cloud-based Head-ends for Media Processing and Application Delivery to Mobile Devices	Berlin, Germany	poster	Sachin Agarwal	NEC	04.-06.07.12
	"Second-Screen Use in the Home: an Ethnographic Study" for the Workshop on Future TV @ EuroITV 2012, based on Diary Study reported in D6.2"	Berlin, Germany	presentation	Jeroen Vanattenhoven	KU Leuven	04.-06.07.12

Description	Title, Topic	Location	Type	Held by	Responsible partner/s	Date
Internationale Funkausstellung (IFA)	HBB-NEXT IFA showcase, RBB and IRT show their work package 4 related showcase for access to synchronised hybrid services	Berlin, Germany	showcase	Bettina Heidkamp-Tchegloff, Jennifer Müller, Janina Renz	RBB, IRT	31.08.-05.09.12
The 2nd IEEE International Conference on Consumer Electronics - Berlin (ICCE-Berlin 2012)	A DVB/IP Streaming Testbed for Hybrid Digital Media Content Synchronization	Berlin, Germany	presentation	Christian Köbel, Christopher Köhnen, Nils Hellhund	THM	03.-05.9.2012
Research discussion with Lourdes Beloqui Yuste from the National University of Ireland, Galway. Common goals and similarities in research goals of WP4 were identified. Joint publications in the future are desired.		Berlin, Germany	discussion	Christian Köbel	THM	03.-05.9.2012
IBC 2012		Amsterdam, Netherlands	conference	Michael Probst	IRT	07.-11.09.2012
54th International Symposium ELMAR 2012	Gesture Identification for System Navigation in 3D Scene	Zadar, Croatia	presentation	Marek Vančo, Ivan Minárik, Gregor Rozinaj	STUBA	12.-14.09.2012
	Speaker identification system based on a web interface	Zadar, Croatia	presentation	Juraj Kacur, I. Lapin., J. Durajka, Gregor Rozinaj	STUBA	12.-14.09.2012
	VoIP intrusion detection system with Snort	Zadar, Croatia	presentation	Pavol Číž, Ondrej Lábaj, Pavol Podhradský, Juraj Londák	STUBA	12.-14.09.2012

Description	Title, Topic	Location	Type	Held by	Responsible partner/s	Date
Special Session: "HBB and Smart Room Technologies", within 5th Joint IFIP Wireless and Mobile Networking conference-WMNC'2012	Special session organisation	Bratislava, Slovakia	leading the special session	Gregor Rozinaj, Bettina Heidkamp-Tchegloff, Renata Rybárová	STUBA	14.5-19.9.2012
	HBB-NEXT: Providing independent content recommendations in a next-generation Hybrid Broadcast Broadband TV ecosystem	Bratislava, Slovakia	presentation	M. Oskar van Deventer	TNO	19.09.2012
	Security challenges in Next generation HBB TV	Bratislava, Slovakia	presentation	Pavol Podhradský, Juraj Londák, Ondrej Lábaj, Juraj Matejka	STUBA, ST	19.09.2012
	Towards novel HBB application platform: experimental testbed	Bratislava, Slovakia	presentation	Tomas Kovacik, Roman Bronis and Ivan Kotuliak	STUBA	19.09.2012
	Face Recognition Methods for Multimodal Interface	Bratislava, Slovakia	presentation	Jozef Ban, Jarmila Pavlovičová, Matej Féder, Luboš Omelina, Miloš Oravec	STUBA	19.09.2012
5th Joint IFIP Wireless and Mobile Networking conference-WMNC'2012	Audio Compression using Sinusoidal Modeling with 1D and 2D Wavelet Residuum Coding	Bratislava, Slovakia	presentation	Radoslav Vargic, Martin Turi Nagy	STUBA	20.09.2012
NGNLab.eu International NGN Workshop 2012	Workshop organisation	Bratislava, Slovakia	workshop	Ivan Kotuliak, Tomáš Kováčik, Eugen Mikóczy	STUBA, ST	20.-21. 09.2012
	The Unified Interface for a VoIP Application	Bratislava, Slovakia	presentation	Jan Muranui	STUBA	20.-21. 09.2012

Description	Title, Topic	Location	Type	Held by	Responsible partner/s	Date
First HBB-NEXT Workshop on Media Synchronisation (in collaboration with ICIN 2012)	Workshop organisation	Berlin, Germany	workshop	Hans Stokking	TNO	11.10.2012
First HBB-NEXT Workshop on Media Synchronisation (in collaboration with ICIN 2012)	Advanced Media Synchronisation for HbbTV and HBB-NEXT	Berlin, Germany	presentation	Arjan Veenhuizen	TNO	11.10.2012
18th International trade fare ELOSYS 2012, Trenčín, Slovakia (STUBA is co-organiser of this trade fair and conference)	HBB-NEXT Poster, Presentattion: "HBB-NEXT Multimodal interface", Demos: "Speaker identification", "Face recognition", "Gesture navigation".	Trenčín, Slovakia	presentation, poster, demos	Gregor Rozinaj, Pavol Podhradský, Juraj Kačúr, Ivan Minárik, Marek Vančo	STUBA	9.-12.10.2012
Conference "Electrical Engineeting, Informatics and Telecommunications 2012, within 18th International trade fair ELOSYS 2012, Trenčín, Slovakia	Signal Parametrization for Robust Systems of Automatic Speech Recognition	Trenčín, Slovakia	presentation	Mario Varga, Gregor Rozinaj, Juraj Kačur	STUBA	11.10.2012
9th International Symposium on Telecommunications, BIHTEL 2012	HBB - European TV Standard for the Future	Sarajevo, Bosnia Herzegovina	invited speech (presentation)	Gregor Rozinaj	STUBA	25.-27.10.212
CHI2013 - Changing Perspectives	group recommendations user evaluation	Paris	conference paper	Jeroen Vanattenhoven, David Geerts	KU Leuven	27.04.-02.05.2013
REDŽUR 2013	Workshop organisation	Slovakia	workshop	Gregor Rozinaj	STUBA	14.05.2013
EuroITV 2013	Implicit ratings in the context of workpackage 5 work	Como, Italy	conference paper	Jeroen Vanattenhoven, David Geerts	KU Leuven	01.07.2013
EuroITV 2013	Resubmission of MUSST workshop	Como, Italy	workshop	David Geerts	KU Leuven	01.07.2013
EUROCON 2013	paper title will be specified	Zagreb, Croatia	conference paper	Pavol Podhradsky, Gregor Rozinaj	STUBA/ST	1.-4.7.2013

Description	Title, Topic	Location	Type	Held by	Responsible partner/s	Date
IWSSIP 2013	paper title will be specified	Bucharest, Romania	conference paper	Juraj Kacur	STUBA	7.-9.7.2013
IBC 2013	Presenting Dev. Cycle 3 early results	Amsterdam, Netherlands	Booth/Demos	Pavol Podhradský, Bettina Heidkamp-Tchegloff	STUBA, RBB, IRT	13.-17. 9. 2013
55th International Symposium ELMAR 2013	papers title will be specified	Zadar, Croatia	conference papers	Pavol Podhradský, Gregor Rozinaj and STUBA/ST team	STUBA/ST	12.-14.2013

### 3.5 Scientific Publications

The HBB-NEXT project team members participated in several scientific events like conferences, symposia and workshops. All these event-related activities form the heart of the "HBB-NEXT dissemination strategy". They are ideal for addressing industry, academia and special interest groups in a focused way. After year one of the project, the HBB-NEXT consortium can proudly look back on a great number of presentations at numerous events. The presentations are listed one by one below.

#### Publication in Journal

- Subsystem for m/e-learning and Virtual Training based on IMS NGN Architecture, published in Bogazici University Journal of Education, Turkey, April 2012, Invited paper (STUBA).

#### Publication in Book

- HBB-NEXT: Europees project voor volgende generatie Hybrid Broadcast Broadband, Input to the iMMovator Yearbook 2011, 13.02.2012 (TNO)

#### Publication in the form of a Poster

- Poster on TV for a Billion Interactive Screens: Cloud-based Head-ends for Media Processing and Application Delivery to Mobile Devices, EuroITV 2012 (NEC)

#### Publications in Conference/Workshop proceedings

- Invited paper, "New Multimedia Applications based on IMS NGN Architecture", 18th International Conference on Systems, Signals and Image Processing (IWSSIP 2011), Sarajevo, Bosnia-Herzegovina, 16.-18.06.11 (STUBA)
- "Enhanced ICT in Virtual Training and m-learning", 53rd International Symposium ELMAR 2011, Zadar, Croatia, 14.-16.09.11 (STUBA)
- 6th International Workshop REDŽUR 2012, Vienna, Austria, 11.4.2012 (STUBA) articles published in conference proceedings (altogether eight):
  - Face Recognition of Images Corrupted by Transmission Errors, authors: Jozef Bán, Matej Féder, Miloš Oravec, Jarmila Pavlovičová, STUBA
  - Speaker Identification Web-Application Based on Java EE Implementing MFCC and KNN Algorithms, authors: Ivan Lapin, Juraj Ďurajka, Juraj Kačúr, STUBA

- Impact of discriminative training to improve recognition for MASPER training procedure, authors: Tibor Trnovský, Juraj Kačúr, STUBA
  - Optimization and implementation of data processing methods for MASPER training procedure, authors: Róbert Kožička, Juraj Kačúr, STUBA
  - Speaker Identification, authors: Matúš Peteja, Juraj Kačúr, STUBA
  - Touchless Computer Control with Hands, authors: Ľubomír Molčan, Marek Vančo, Ján Tóth, STUBA
  - Computer Control with Eyes Pupil Localization, authors: Martin Štofaňák, Ján Tóth, Anna Kondelová, STUBA
  - Modular speech synthesizer in Python, authors: Matúš Vasek, Gregor Rozinaj, STUBA
- An Introduction to Speech Synthesis Management Tools, published in conference proceedings, 19th International Conference on Systems, Signals and Image Processing, IWSSIP 2012, Vienna, Austria, 11.4.2012, authors" Anna Kondelová, Ján Tóth, Matúš Vasek, Gregor Rozinaj, STUBA
  - Innovative Broadcasting Architecture for E-learning Improvement. In Proceedings of World Conference on Educational Multimedia, Hypermedia and Telecommunications 2012 (pp. 1589-1594). 26-29.6.2012 (STUBA)
  - A DVB/IP Streaming Testbed for Hybrid Digital Media Content Synchronization, The 2nd IEEE International Conference on Consumer Electronics – Berlin, Germany (ICCE-Berlin 2012), 03.-05.9.2012 (THM)
  - 54th International Symposium ELMAR 2012, 12.-14.09.2012, Zadar, Croatia, articles published in symposium proceedings (altogether three):
    - Speaker Identification System based on a Web Interface, authors: Juraj Kačúr, Ivan Lapin, Juraj Ďurajka, Gregor Rozinaj, STUBA
    - Gesture Identification for System Navigation in 3D Scene, authors: Marek Vančo, Ivan Minárik, Gregor Rozinaj, STUBA
    - VoIP Intrusion Detection System with Snort, authors: Pavol Číž, Ondrej Lábaj, Pavol Podhradský, Juraj Londák, STUBA



- Special Session: " HBB and Smart Room Technologies", within 5th Joint IFIP Wireless and Mobile Networking Conference - WMNC 2012, 19. - 20.09.2012, Bratislava, Slovakia, articles published in conference proceedings (altogether five):
  - HBB-NEXT in the context of Hbb TV 2.0, invited paper, authors: Bettina Heidkamp-Tchegloff (RBB), Michael Probst (IRT),
  - HBB-NEXT Providing independent content recommendations in a next-generation Hybrid Broadcast Broadband TV ecosystem, authors: M. Oskar van Deventer, Joost de Wit, Bas Gerrits (TNO), Mark Guelbahar, Michael Probst (IRT)
  - Face Recognition Methods for Multimodal Interface, authors: Jozef Ban, Jarmila Pavlovičová, Matej Féder, Luboš Omelina, Miloš Oravec, (STUBA)
  - Towards novel HBB application platform: experimental testbed, authors: Tomas Kovacik, Roman Bronis, Ivan Kotuliak (STUBA)
  - Security challenges in Next generation HBB TV, authors: Pavol Podhradský, Juraj Londák, Ondrej Lábaj, Juraj Matejka, STUBA, ST
- Signal Parametrization for Robust Systems of Automatic Speech Recognition, Conference "Electrical Engineering, Informatics and Telecommunications 2012, within 18th International trade fair ELOSYS 2012, Trenčín, Slovakia, 11.10.2012 (STUBA)

### 3.6 Website

Content-wise RBB continuously updated the HBB-NEXT website, mainly the news section. For this section RBB collected input from the project partners and regularly edited and published news items. A new concept for the news on the site was created together with STUBA and then implemented by them with additional functionalities. Now each of the three most up-to-date news articles, which are shortly presented on the starting page, appears in full length on its own site. The news section as such was restructured: the most recent article is featured on top; below this article the 20 most recent articles can be accessed via pictures and an additional news archive features all articles and provides an overview of project activities from the start. In addition, the news chronology was revised and improved.

Two (linked) modules were created by STUBA for promoting the HBB-NEXT events "Media synchronisation workshop" and "Special session HBB and Smart Room Technologies" within WMNC conference.

In addition, TNO/STUBA created a subsection on the website for the „Media Synchronisation Workshop“, and the twitter module on the website was improved.

Very recently STUBA redesigned the site to show a cross-browser responsive design with CSS3 media queries. It is now possible to style a page based on different display situations such as width, height, orientation, resolution, etc. Using JavaScript to toggle the menu means that the page is automatically scaled to meet the demands of small displays of smartphones or tablets.

The HBB-NEXT project website is supported by all project partners to provide a common view of the project. It is updated regularly and with its dedicated news section already provides a good overview of the major project activities since the start of the project. The site is monitored by RBB, supported by the Editorial Calendar described in the introduction of this document.

HBB-NEXT published news items on the website and HBB-related general news were published regularly on Twitter and Facebook. Furthermore several videos were published via an HBB-NEXT youtube Channel and promoted via Twitter und Facebook.

### Demo on HBB-NEXT YouTube channel

As part of HBB-NEXT Work Package 4, which deals with media synchronization and cloud offloading, HBB-NEXT project partner TNO has developed a first working prototype of a hybrid-broadcast-broadband synchronization client. Using the developed technology, it is possible for an HBB-NEXT client to synchronously play out content received over different access technologies and streaming protocols. In the demonstrator, two DVB streams are synchronized with an HTTP Live Streaming (HLS) stream delivered over IP in a frame-accurate way. This work represents a significant milestone for WP4 and HBB-NEXT in general. In the future, Work Package 4 plans to expand the synchronization concepts employed in the prototype to multi-device scenarios where audio and video are synchronized across devices such as smartphones and tablets.

### 3.7 Dissemination Materials

Even though it was just meant to be a plan, D7.2 already described some of the dissemination materials. This is a short re-cap with some updates:

The following dissemination materials are available:

- HBB-NEXT logo that was created right at the start of the project.
- HBB-NEXT general project flyer. This flyer will be updated in the near future to include early results of the project
- For the HBB-NEXT IFA Showcase RBB, jointly with IRT, produced an additional page for the HBB-NEXT project flyer providing short, basic information both in English and German. The page is loosely inserted into the flyer. This is a convenient approach also for further specific HBB-NEXT events. People then get the general information through the flyer plus special information in this little extra page.



Figure 16: An additional page for the HBB-NEXT project flyer providing short, basic information both in English and German

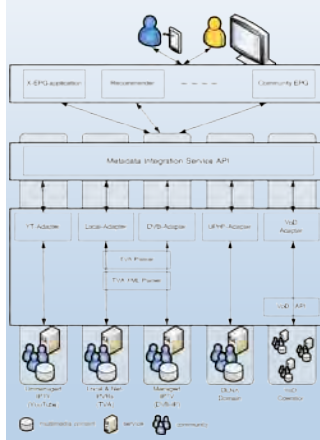
- HBB-NEXT presentation slide template including basis presentation with all relevant facts
- Poster template highlighting more general aspects of the project. Planned: Poster template for a more specific poster which can then be adapted by the respective partners to suit special events, workshops etc.
- Three posters on work package 5 Milestone 6 achievements by TNO, IRT and THM:



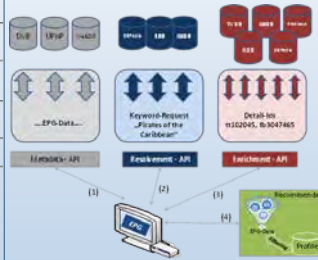
## Providing Rich Hybrid Metadata

HBB-Next vision: Recommending content from multiple sources, playing on multiple devices, consumed by multiple users.

**Metadata Integration Service**  
provides content metadata from various sources



**Metadata Enrichment Service**  
Uses open sources (DBPedia, IMDB etc.) to enrich hybrid metadata & strengthen recommender accuracy



**Planned**

- Web-Service Interfaces
- Platform that is open to RSPs
- Notification framework
- Identity-management

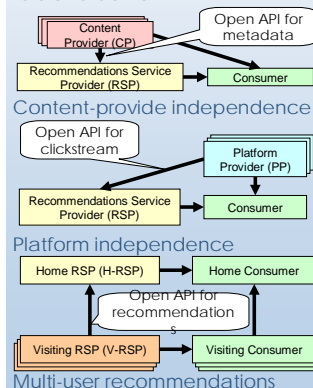
FP7-287848 HBB-NEXT



## Providing independent content recommendations

HBB-Next vision: Recommending content from multiple sources, playing on multiple devices, consumed by multiple users together.

**Recommendations Service Provider** as a separate business role and domain

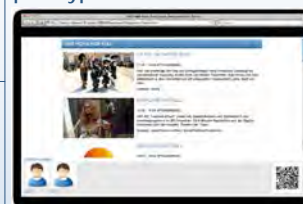


Multi-user recommendations

FP7-287848 HBB-NEXT



First multi-user multi-content prototype



**Planned**

- Open API for metadata
- Metadata enrichment
- Platform that is open to RSPs
- Notification framework
- Open API for click stream
- Multi-user recommendations
- Open API for recommendations
- Identity-management

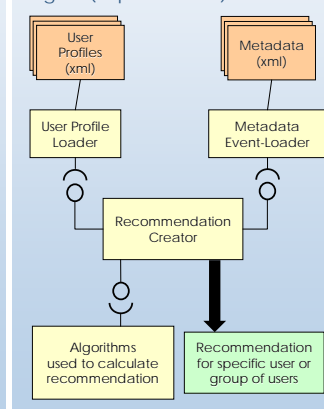
**WORK IN PROGRESS**  
**CHECK BACK SOON!**



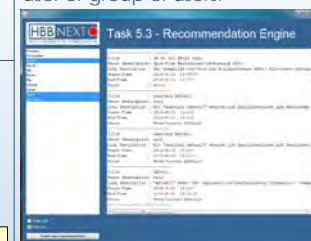
## Recommendation engine based on collaborative filtering

HBB-Next vision: Recommending content from multiple sources, playing on multiple devices, consumed by multiple users together.

**Model: Recommendation engine (implemented)**



**Test application:** creates a list of recommendations for a specific user or group of users.



**Planned**

- Combination of linear(e.g. DVB) and non-linear(e.g. YouTube) content, based on IRT combined metadata.
- Combination of collaborative and content-based filtering in cooperation with the IRT.
- Optimizing of multi user recommendation precision and performance.

FP7-287848 HBB-NEXT

Figure 17: Work package 5 Milestone 6 related developments – posters



Furthermore in the context of IFA, RBB updated its HBB-NEXT page on its company pages [17], wrote special invitations and sent them to a large mailing list both inside and outside RBB and ARD, as well as a contribution for an IFA Dossier for the RBB company website [18].

Two posters: "Face recognition System with Continuous Authentication" and "Speaker Identification System" (prepared by STUBA) present some applications for user identification (related to work package 3 and 5).

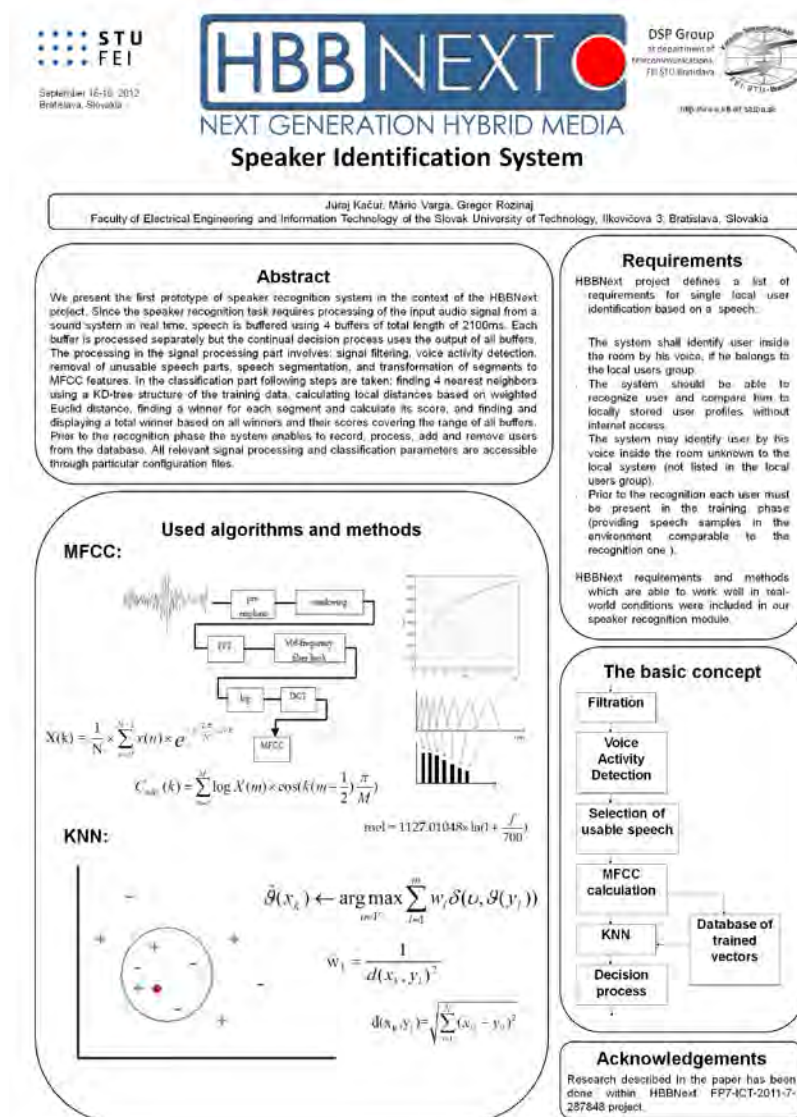


Figure 18: Speaker Identification System - Poster

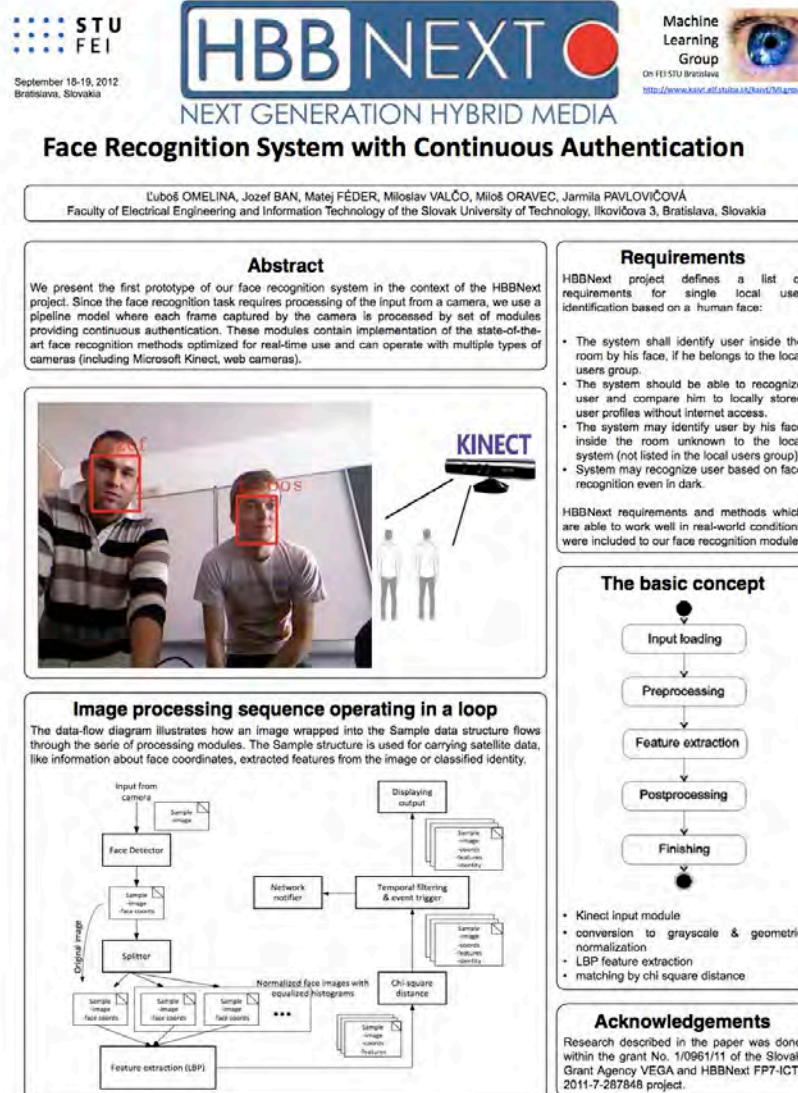


Figure 19: Face Recognition System - Poster

### 3.8 Concertation Activities

HBB-NEXT wants to establish links and synergies with other European and International research activities in progress, and strives to build on the results of completed and on-going R&D projects in accordance with the applicable IPR (Intellectual Property Rights) frameworks and procedures. The activities described below in the first project year will hopefully now get a new boost through the restructuring process at the EC. The project partners are looking forward to getting to know the other projects of Unit G.1 - Converging Media & Content and finding out about future clustering options.

### Networked Media 8th FP7 Concertation Meeting - 13.-14.12.11

A presentation to introduce HBB-NEXT was given by Bettina Heidkamp-Tchegloff (RBB) at the "Networked Media 8th FP7 Concertation Meeting" in Brussels, Belgium, 13.-14.12.2011.



*Figure 20: Bettina Heidkamp-Tchegloff (RBB) presenting at the Networked Media 8th FP7 Concertation Meeting – 13.12.-14.12.11*

### HBB-NEXT and LinkedTV - “Mini-Cluster”

The project started concertation activities in the DG INFSO Networked Media Systems Unit, last year supported by its former project officer Francisco Medeiros. At the Unit’s 8th Concertation Meeting on 13/14 December 2011 the project was presented by RBB and IRT. Here, it was decided to form a new “Mini Cluster” of the two projects HBB-NEXT and LinkedTV in order to promote “Connected TV and Media Applications”. The first deliverable of this Mini Cluster was a joint contribution to the Public consultation on the FP7 ICT Work Programme 2013 Networked Media sector Objective 1.5. A paper and a presentation were prepared and IRT presented these at the Consultation Workshop in January 2012, supported by Fraunhofer IAIS.

### HBB-NEXT and LinkedTV: Public Consultation on the FP7 ICT Work Programme 2013 "Networked Media Systems" - 27.01.2012

HBB-NEXT was present at the "Workshop for the public consultation process on FP7 ICT Work Programme 2013 - Networked Media sector". Ralf Neudel (IRT) presented a contribution on the future of TV, inspired by the two FP7 projects HBB-NEXT and LinkedTV (evolving mini-cluster on “Connected TV and Media Applications” of the Networked Media Sector).



The workshop held in Brussels presented the relevant public contributions on the Objective: Connected and Social Media of Work Programme 2013. Its Call 10 will be published in autumn 2012 and will be the last call of FP7.

### **HBB-NEXT and LinkedTV: 3rd International Workshop on Future Interactive Television at EuroITV 2012 - 10th European Interactive TV Conference "Bridging People, Places & Platforms" - 04.-06.07.12**

The workshop at this event, which is described above in section 3.2, was again a nice example for the cooperation of the two projects LinkedTV and HBB-NEXT. It was held on the pre-conference day of the EuroITV 2012 the 3rd edition of the Future Television workshop. There was a full room with many interesting discussions around future trends and developments in television. Jeroen Vanattenhoven of KU Leuven gave a presentation on HBB-NEXT User Validation.

### **HBB-NEXT and LinkedTV: Meeting TNO and Noterik**

On 2 March, TNO and Noterik met in the context of the FP7 projects HBB-NEXT and LinkedTV, in which they are respectively active. The main purpose of the concertation activity was to get to know each other better. TNO presented their on-going project and prototypes related to metadata extraction. Noterik presented their video platform and its application to video portals. Two areas were identified for possible future collaboration.

### **HBB-NEXT and LinkedTV: LinkedTV at Special Session**

Dr. Lyndon J B Nixon - STI International Consultancy and Research GmbH, Austria – Technical Coordinator of LinkedTV presented a paper on “How open data can enhance interactive television” at the Special session "HBB and Smart Room Technologies", within 5th Joint IFIP Wireless and Mobile Networking conference-WMNC in Bratislava, Slovakia, organised by STUBA, 19. - 20.9.2012.

### **HBB-NEXT and Fascinate: Ad-hoc Workshop - 18.06.2012**

On 18 June 2012, partners of the European projects HBB-NEXT and FascinatE got together in an ad hoc workshop. The event was organized by TNO - which participates in both projects - and hosted by IRT at their premises in Munich. The workshop attendees, about 20 in total, had a fruitful exchange of views and discussed topics of joint interest, such as media synchronization, cloud processing, personalization and business models. While they concluded that the projects are rather complementary than overlapping, they also found that some technical challenges may be approached with similar solutions in both projects, e.g. for synchronizing audiovisual media or rendering in the cloud. These topics may lead to future discussions between the partners of both projects.



*Figure 21: Partners of European projects HBB-NEXT and FascinatE got together in an ad hoc workshop*

#### **Concertation at STUBA and TNO**

Early at the beginning of the HBB-NEXT project, the concertation activities between HBB-NEXT and running research projects coordinated by the STUBA team were introduced: DAAD project: ASIMD - Audio-Speech Interface for Mobile Devices (Gregor Rozinaj), basic research projects VEGA: 1/0961/11, "Advanced Algorithms on Image Processing for Effective Search and Coding of Human Faces" (Jarmila Pavlovičová), 1/0718/09, "Algorithms and Methods of Multimedia Signal Processing for Human Machine Interface" (Gregor Rozinaj), 1/0214/10, "Design of Methods for Analysis and Classification of Biometric Image Recognition of Human Faces and Traffic off Communication Networks" (Miloš Oravec). The developed algorithms and methods, as well as know-how, expertise and experience of research teams of mentioned research projects, who are also members of STUBA HBB-NEXT research team, have had positive impact on HBB-NEXT research activities. TNO has been active in the Future Media Networks Cluster, also on behalf of HBB-NEXT. This concerned mainly communication on ETSI-related standardisation issues.

#### **Exchange on Synchronisation issues with National University of Ireland, Galway**

During this year's IEEE International Conference on Consumer Electronics (ICCE 2012), Christian Köbel of THM met with Lourdes Beloqui Yuste from the National University of Ireland, Galway. The contact had been initiated by Dr. Hugh Melvin, who is the PhD. supervisor of Lourdes Beloqui and seen the HBB-NEXT website. Like THM Lourdes is conducting research in the synchronization domain. She participated in Qualinet [19] and presented the paper "Client-side Multisource Media Streams Multiplexing for HbbTV" at ICCE 2012 in Berlin. Her findings are highly relevant for HBB-NEXT developments on synchronization.

In several discussions at ICCE, interesting similarities between Lourdes Beloqui's research and HBB-NEXT objectives in inter-media synchronization were identified. Essentially, she is currently building prototypes that allow a tight synchronization of media streams from separate sources. Although she is using different transmission protocols and media formats, there is a promising potential for joint research within the scope of HBB-NEXT WP4 goals on synchronization in the future.



*Figure 22: Conference Dinner with Lourdes Beloqui Yuste, from the National University of Ireland, Galway, Christian Köbel of THM and Technicolor colleagues within the IEEE International Conference on Consumer Electronics (ICCE 2012)*

#### 4. Short re-cap of HBB-NEXT Exploitation Strategy

It is the goal of HBB-NEXT that the foreground developed in the project will eventually allow providers of Hybrid Broadcast Internet services to offer novel multimedia applications. Its new architectures and components should stimulate and offer new possibilities, not only for broadcasters and service providers but also for application designers and producers (e.g. new programme formats). At the other end of the chain, the end-user is offered a novel social TV experience. D2.4 Business Models has tried to show that HBB-NEXT enablers will allow enhancing existing service offerings by enabling existing service providers to expand their scope of operations as well as by enabling new players, e.g. the Rich Media Provider to enter this market.

To fulfil these HBB-NEXT goals, the strategy for the use of foreground will address:

- the implementation of new products based on the HBB-NEXT features for end-users enabling new truly personalised services with social aspects available via various end-devices.
- the offering of consultancy services in the area of media/content service domains to provide support on strategic/tactical levels.
- the inclusion of the project outputs in media/content broadcasting and interactive TV studies at universities for Bachelor and Master Students.
- the availability of project research outputs to experts and PhD level researchers.
- the involvement of each partner in developing the strategy for the use of foreground according to their expertise and business domain.

Exploitation activities have been planned and started, however, they will increasingly move to the focus— only now first concrete project results start becoming available.

## 5. Exploitation Activities

In the dissemination strand of dedicated feedback meetings from the stakeholder value chain, TNO already organised a Dutch HBB-NEXT Feedback Workshop, only six months after the project had started. It was held on 19.3.2012 and the participants included Dutch broadcast companies, a media system integrator, a publishing company of TV guides and a closely related FP7 project (SBS, NPO, RTL, Noterik, Niamat Media Group, Bindinc, Divitel, KPN, TNO). The idea is to have a regular forum that will take place twice a year. Such workshops are extremely valuable for the on-going development work of the project: Like the input from the HBB-NEXT user validation sessions such “real world” feedback will help fine-tuning the objectives of the project and sharpen its approach to meet the demands of industry and consumers.

The outcome of this first workshop was very encouraging: the participants were quite enthusiastic about the HBB-NEXT objectives and confirmed their willingness to regularly provide constructive feedback. This first meeting mainly focused on the first project deliverable D2.1 Usage Scenarios and Use Cases. The next Dutch HBB-NEXT Feedback Workshop is planned for October or November.



Figure 23: Participants of the First Dutch HBB-NEXT Feedback Workshop - 19.03.2012

### 5.1 Transfer of HBB-NEXT research results to Bc, MSc and PhD theses

Graduate student Mohammad Khairul Islam from the University of Lulea, Sweden, worked at TNO in the context of the HBB-NEXT project. Started on 1 March 2012, he presented his technology analysis within TNO at 29 August 2012. His presentation explained the use of PCR values in Transport Stream (TS) for synchronisation. Manipulation of the PCR values is one approach to achieve the different types of synchronisation required for HBB-NEXT.

The PhD themes of STUBA young researchers they are participating in the HBB-NEXT project are focused on these project topics. In this way the relevant project results are exploited to following PhD theses of the STUBA students:

- 3D Face Recognition (PhD student: Marek Vanco), started on 1st October 2011, supervisor: Gregor Rozinaj
- Gesture Recognition (PhD student: Ivan Minarik), started on 1st October 2011, supervisor: Gregor Rozinaj
- Personalisation of Services and control of access to multimedia services and applications (PhD student: Juraj Blichár), started on 1st September 2012, supervisors: Jarmila Pavlovičová and Pavol Podhradský
- Implementation of novel services over broadcasting architecture (PhD student: Roman Bronis), started on 1st September 2012, supervisor: Ivan Kotuliak
- Control of the access of integrated services (broadband broadcast services and IP services) in the hybrid network environment (PhD student: Alexandra Posoldová), started on 1st September 2012, supervisors: Miloš Oravec and Pavol Podhradský
- Human Face Detection and Recognition (PhD student: Marek Loderer), started on 1st September 2012, supervisor: Jarmila Pavlovičová
- New Methods of Biometric Face Recognition in Unconstrained and Uncontrolled Environment Using Machine Learning Methods (PhD student: Vojtěch Jirka), started on 1st September 2012, supervisor: Miloš Oravec
- Proposal of Methods of Analysis, Visualization and Classification of Multidimensional Data (PhD student: Dávid Hrbatý), started on 1st September 2012, supervisor: Miloš Oravec

The HBB-NEXT research activities and outputs have addressed several Bc and MSc STUBA students and have motivated them to select themes for their Bc and MSc theses and team projects, as well related to HBB-NEXT topics:

- Personalized multimedia TV services delivered to mobile devices (MSc student: Daniel Kučera), started on 1st October 2011, supervisor: Eugen Mikóczy, ST and STUBA
- Communication Interface for Modular Speech Synthesis (MSc student: Tomas Horvath), started on 1st October 2011, supervisor: Gregor Rozinaj



- Personalized multimedia TV services delivered to mobile devices (MSc student: Juraj Horváth), started on 1st October 2011, supervisor: Eugen Mikóczy, ST and STUBA
- Automatic speech recognition –the use of linear transformation improving modeling facilities of HMM models (MSc student: Robert Kozicka), started on 1st October 2011, supervisor: Juraj Kacur
- Automatic speech recognition –corrective training of HMM models increasing the model separation (MSc student: Tibor Trnovsky), started on 1st October 2011, supervisor: Juraj Kacur
- Speaker identification (MSc student: Matus Peteja), started on 1st October 2011, supervisor: Juraj Kacur
- Proposal and implementation of interactive application in the HBB environment (Bc student: Peter Homa), started on 1st October 2011, started on 1st October 2011, supervisor: Eugen Mikóczy, ST and STUBA
- Gesture Navigation for Email Control (team project: Biro Tomas, Gabrisova Jaroslava, Raskovic Vladan, Rusnak Martin. Votruba Andrej), started on 1st October 2011, supervisor: Gregor Rozinaj
- Automatic speech recognition (MSc student: Matus Strban), started on 24th September 2011, supervisor: Juraj Kacur
- Speaker identification (MSc student: Tomas Olexa), started on 24th September 2011, supervisor: Miloš Oravec

## 5.2 Overview current Exploitation activities

- Transfer of HBB-Next knowledge within the unit "Next Generation Networks, Services, Protocols" in the Master course "Computer and Telecommunication Systems and Networks" at FIIT STU Bratislava, February - May 2012 (STUBA)
- Transfer of HBB-Next knowledge within the "3rd age University" at STU Bratislava, within the lecture "Multimediálne IKT technológie, Multimediálne služby a aplikácie" (Multimedia ICT, Multimedia services and applications), 25.5.2012 (STUBA)
- First multi-user content recommendation prototype, demo on HBB-NEXT YouTube channel, 20.6.2012 (TNO)

- Ad-hoc Fascinate HBB-NEXT workshop, workshop organisation, Munich, 18.6.2012 (IRT, TNO)
- Transfer of HBB-NEXT knowledge to the LdV EU project IMProVET, within training courses: "Multimedia" and "NGN and Selected topics", continual process, October 2011 to October 2013 (STUBA)
- Transfer of HBB-NEXT knowledge to the research activities within 2 PhD theses: "Gesture Recognition" and "3D Face Recognition", continual process, October 2011 to March 2014 (STUBA)
- Transfer of HBB-NEXT knowledge to the research activities within 7 PhD theses: "Control of the access of integrated services (broadband broadcast services and IP services) in the hybrid network environment", "Speech Recognition of Slovak Language with Hidden Markov Models", " Human Face Detection and Recognition", "Personalisation of Services and control of access to multimedia services and applications", "New Methods of Biometric Face Recognition in Unconstrained and Uncontrolled Environment Using Machine Learning Methods", "Proposal of Methods of Analysis, Visualization and Classification of Multidimensional Data" and "Implementation of novel services over broadcasting architecture", continual process, September 2012 to March 2014 (STUBA)
- Transfer of HBB-Next knowledge to the research activities within 6 MSc theses: "Personalized multimedia TV services delivered to mobile devices" - 2 students, "Communication Interface for Modular Speech Synthesis", "Automatic speech recognition –the use of linear transformation improving modeling facilities of HMM models ", "Automatic speech recognition –corrective training of HMM models increasing the model separation", "Speaker identification", September 2011 - June 2012 (STUBA)
- Transfer of HBB-Next knowledge to the research activities within 1 Team project: "Gesture Navigation for Email Control", September 2011 to June 2012 (STUBA)



### 5.3 Future Exploitation activities

- Transfer of HBB-Next knowledge to the research activities within 2 MSc theses: "Automatic speech recognition", "Speaker identification", September 2012 to June 2013 (STUBA)
- Transfer of HBB-Next knowledge to the research activities within 1 Bc theses: "Proposal and implementation of interactive application in the HBB environment", September 2011 to June 2012 (ST, STUBA)
- Second Dutch HBB-NEXT Feedback Workshop (workshop organisation), 1.11.2012, (TNO)

## **6. Conclusion and Outlook**

The HBB-NEXT partners can look back on a very busy first project year. With regard to our dissemination efforts this means that a lot of activities were undertaken. Since the start of the project manifold dissemination activities started and shortly after the start basic dissemination materials, a logo and an attractive website were in place. STUBA and RBB jointly devised our main tool, an Excel table that is used for all planning and documentation of any dissemination, exploitation or standardisation activity. This helps to keep an overview in monitoring all these activities and for making sure that it is all fine-tuned, documented and disseminated via our website and social media channels.

After six months the dissemination and exploitation strategy was in place (D7.2.) and has been implemented since. While year one first started by raising general awareness of the project, the project has recently increasingly started to embark on more specific dissemination, such as promoting aims, goals and also first results to the scientific community and also to stakeholders such as broadcasters and service providers. With the work package 4 related HbbTV based showcase the project was able to already present an attractive demo both at the International Broadcasting exhibition (IFA, ARD booth/RBB) in Berlin and also at the IBC in Amsterdam (IRT booth). In both cases feedback was very positive. Concrete plans for project year two are already under way; the project plans another dedicated HBB-NEXT workshop for next summer and also its presentation with a proprietary booth at IBC 2013 and possibly a second demo at IFA 2013. It will also try to be present with a dedicated joint HBB-NEXT contribution at some important conferences like EuroITV 2013.

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