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INTERNATIONAL TELECOMMUNICATIONS UNION

FG AVA WORKSHOP

MAKING MEDIA ACCESSIBLE TO ALL: THE OPTIONS AND THE ECONOMICS

OCTOBER 24, 2013

14:00 CET

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>> Ladies and gentlemen, good afternoon, everybody and welcome to the ITU workshop "Making Media Accessible to All: The Options and the Economics." We finished the work of the focus group. So we would like to just announce a few things for the new participants we have in the room. You will have to use the head phones and use the items. You can see and regulate to hear better. We have remote participants. We have a moderator. We have captioning online from Colorado. And we will start now with the opening remarks with Malcolm Johnson, and we will start the workshop. We will hand over to Mr. Malcolm Johnson.

>> MALCOLM JOHNSON: Thank you very much, Alexandra and welcome to ITU. Let me first of all say congratulations to the chair and the members of the focus group that completed its work this morning. I think that's tremendous effort that's going to greatly help ITU take forward the work that we are doing, both in this sector and the other sectors on accessibility and, of course, the study groups will follow up on the work of the focus group. So to all of you that participated in the focus group, many thanks for your efforts and congratulations on that and Alexandra, thanks for all the effort you have put in to supporting that focus group.

So welcome to this workshop on making media accessible to all. The options and the economics.

And ITU has a very long history of association in developing standards for ‑‑ in the area of accessibility. In fact, ITU was the first standards body to produce a standard specifically on accessibility. For persons with disabilities and we are very proud of that fact. And we are taking it forward, the momentum has grown greatly over the last few years in this area. And the goal, of course, is the universal access for everyone and to do this, we focus on the three elements, universal design, availability and affordability. And the mission of ITU, of course, is to connect the world. So we are not achieving that mission unless we also connect the estimated 1 billion people with disabilities.

And this is why we are placing a lot of emphasis on this goal in ITU. Effective standardization will increase the quantity and the quality of accessibility services and to be successful in that aim, we need to provide for the users to participate in the development of the standards. So we have been making every effort to enable persons with disabilities to participate in our work through various means such as what we have today, with the captioning. We try and provide captioning in many of our meetings, especially meetings that are doing work in the area of accessibility. And we aim to make these standards widely available to all persons and, actually, this is the subject of a discussion that is going on in the room opposite here this week, related to the ITU IPR policy, because we are in the business of developing international standards that provide for interoperability and are nondiscriminatory so that any patent which is included in any ITU standard has to be made ‑‑ the patent holder has to commit to make that patent available on reasonable and nondiscriminatory terms.

And if they don't make that commitment, that technology is not included in the standard. So we have a group that advises us IPR and looking at paents and also ways of reducing the number of injunctions that we have seen recently.

We have produced some simple standards and we produced very complex standards, standards such as telephone service pictograms and other common ones like sign language and video codex and on relay services and we also, whenever we speak on this issue, we also emphasize to industry that this is a business opportunity as well, getting involved in developing standards for accessibility and producing products and services to those standards are a it business opportunities because we are talking about 1 billion people. It's not always recognized as a business opportunity. We always try to emphasize that as well and to get as many of the 400 or 500 companies at work in the T sector to recognize that. And access to the media, this is why we focused the focus group that concluded its work today.

And we are also very proud of the fact that ITU is the first UN agency, the first organisation in the UN to adopt and accessibility policy. And this policy aims to achieve full participation of persons with disabilities in ITU's work. We have already, as I said, made great progress in ensuring that that does happen.

It's interesting, in fact, that captioning is being very well received by just about everybody, you know, because we often work in English. And because it's very expensive to provide interpretation and translation. So delegates without English as their mother tongue, they often find it very helpful to look at the captioning when anyone is speaking. And it's become very, very popular, I'm pleased to say in ITU that we have the captioning.

You may have seen the Popov Room, our most recently furbished. We have one screen where we have the captioning and then we have another screen where we have a video of person speaking. And it's quite disconcerting when you are on the podium and you are speaking to this room and nobody is looking at you because they are either looking at the video on this screen or they are looking at the captioning on that screen.

(Laughter).

It looks as if nobody is listening to you. Anyway, we are very, very pleased that, you know, we are making progress in this area, and that we are having good contributions and that we are getting these people participating in our work and that we also have very good relationship with our sister sector, the radio communications sector. This is ‑‑ it's the standardization sector, because ‑‑ because there is some standard standardization work being done in the radio sector as well. We work very closely to go and I'm very pleased because we have more and more joint activities including one on accessibility. We have the new intersector Rapporteur group on audio/visual and media accessibility and we work very closely with the study group 6 in the ITU‑R. I'm pleased to see the chairman here.

So before I hand it over to Seong‑Ho and thank him for chairing this workshop, I would also like to mention that in ITU, we started ‑‑ we have introduced what we call challenges. We put out a call for papers and for new ideas and innovative ideas in a particular area. It started in the area of climate change where we also do a lot of activities. So we had a green challenge to come up with an idea of an app that could be used on an existing mobile platform, which can help to improve the challenges being faced on environment, climate change. Then we have some of our companies that are members of ITU offering a prize for the best ‑‑ the Bev idea. We have a panel to choose what ‑‑ best idea. We have a panel to choose what that will be. There's a prize of $5,000, $10,000. And then the idea is that it will be commercialized by some of the areas. We are doing the same in accessibility. So using the IPTV platform, to come up with innovative idea with the theme of better quality of life with global standards and accessible world for all.

So the challenge is supported by the international Paralympic committee. So it will be ‑‑ the winner will be chosen. We will have a prize, hopefully. There will be companies welling to commercialize the idea, and then the winner will be showcased at the 2016 games.

So it's worked very well in the area of climate change. We have had some very high profile, really excellent idea and that have emerged there that have been commercialized. And we hope it will be the same in this area as well, the further way we can help to join forces and make sure that the next generation of products and services are accessible to persons with disabilities and, therefore, to all of us since it's not only persons with disabilities but also the aged, which is a growing part of the population and hopefully we will all get there. So we will all be benefiting from this technology.

So thank you very much, and I wish you very enjoyable and ‑‑ and interesting successful workshop and thanks very much, once again for taking over.

(Applause).

>> SEONG-HO JEONG: Thank you very much, again, for excellent remarks. Good afternoon, ladies and gentlemen, I'm Seong‑Ho Jeong the chair of this workshop. I would like to begin by thanking the TSB director, Malcolm Johnson, for his opening remarks and what ITU does for accessibility.

As Mr. Johnson mentioned, TSB is the first to tackle the accessibility issues. Many who are here today were instrumental in making that happen. I sincerely thank you for driving this valuable work.

Over the next day and a half, our workshop will discuss how to make media accessible to all, using four sessions, each of which will feature a number of presentations by experts as well as a Q/A component. In the first session, we will discuss the needs of users and the options currently available to them. We will review existing accessibility services as well as emerging next generation services that are just coming into the main stream new. So we will highlight the services from the content provider. And at the close of the day, we will have an interaction discussion between the participants to draw the key conclusions from the day's events and this will be followed by the demos of accessibility services.

In the second session tomorrow, we will look at recent developments in media accessibility, which have introduced means to improve the accessibility of devices. In other words assistive technologies.

In the final session, it will be split into three parts, taking examples from across the world of successful business models for rolling out accessibility services. So we will have presentations on the experiences of China, Argentina, Brazil, Japan, Denmark, Canada, and the European Union and Switzerland. I'm quite certain that these presentations will provide sufficient fuel for our closing interaction discussions for accessibility services.

We have an hour to this concluding session, catering for what will surely be a lively discussion and my distinguished colleague, Ms. Pilar Orero, we will take notes so they can be fed into ITU's accessibility studies.

It promises to be a very informative discussion. I'm very much looking forward to it. So I would like to start the technical sessions by introducing the first session chair, Ms. Mia Ahlgren from Swedish Disability Federation.

So thank you very much, again, for your participation. So first of all, I would like to thank Mr. Malcolm Johnson for coming here. Please put your hands together for Mr. Malcolm Johnson.

(Applause).

And Mia, the floor is yours.

>> MIA AHLGREN: Thank you very much. I'm very honored to be here today to chair this session. The first session of the workshop that will deal with the needs and the options for media accessibility. And this first part will take up the access services that most of you here are familiar with, I think. I think that my thoughts to initiate this pitch were taken away by the examples by Malcolm Johnson that we just heard. I think if there were more leaders like that, then we would have more media accessibility available, because media, of course, plays a part in our daily lives and as Malcolm Johnson said when it comes to realtime transcripts, this is an example that in a given situation, these access services are not only indispensable for the people who are hard of hearing or hard of seeing, it's also indispensable for everybody in a given situation, like if you are in a noisy environment or so on.

But I will not take up more of the time. I will soon give the floor to our first speaker but before then, that I would like to say that we will have these three presentations now first. And after the presentations, we will have time for questions and answers and I would especially recommend our remote participants to start commenting on the chat box and we have a moderator here would will keep you company. So you can get a head start of questions you want to ask afterwards.

So first of all, Pilar Orero, you are the coordinator of the working group for audio description and spoken subtitles.

>> PILAR ORERO: With Aileen.

>> MIA AHLGREN: Who is in the room here as well. You have been working for ten years on access services at Universitat Autonoma de Barcelona, and I think I'm so much looking forward to your presentation that will take up optional subtitles, closed captions, audio descriptions and audio subtitles.

Please, Pilar.

>> PILAR ORERO: Thank you very much, Mia for the presentation. This is the opening speech and I wanted to show you that we are in a standards organisation where they do standards and we talk about the main translation, what I say the main modality, which are subtitles and audio description subtitles, but all the issues have a high impact in accessibility. The language that we talk about very much, when we talk about costs, and time seems to be not an important issue, but we will hear that time, or the time delay is what nowadays is making the biggest noise and complaints by the users, the desynchronization of caption, for example, and quality. All the services in most countries are regulated towards quantity. We have many hours or percentage of services that have to be broadcasted, but now the next issue, when you are qualified with the quantity is the quality. How do we measure quality? So that would be to me, the four issues.

Yes, one of the important things with media accessibility is languages. We have mono lingual countries. It's not across the board that we use subtitle or captions for all the countries in the world because it depends if you are a large language, like, for example, English or Brazilian or, sorry Portuguese or Spanish, they have all the technologies, Chinese, for example, you have all the language technologies in these languages.

For example, if you are Danish, it's a very small language, with 7 million users and the technologies are not developed because companies are not happy to invest in the small languages. So they are not competing on an equal basis, the large languages with the small languages.

And the other issue that has direct impact, if depends if you are a dubbing company, a subtitle country, or an English‑speaking language because, again, accessibility in Australia or North America, or the UK, it doesn't have exactly the same system as the rest of these languages.

So as you can see, not all the countries have accepted the same translation modality for the content.

In Europe, we already have this big problem, or this big diversity or richness, whatever you want to consider it. And the solutions for media access are completely different in some countries than the other. You have the blue countries that are subtitling countries. You have the red countries which are dubbing countries and you have the gray and the yellow countries, which are voiceover countries. Okay?

So the voiceover countries, to have a sort of bird's eye view on what is going on on accessibility for them, is that subtitles are starting to be a possible mode. They are beginning to use subtitles in these countries, but a subtitle for the deaf and the hard‑of‑hearing are not fully deployed. Subtitling takes over the SDH. The audio description plus voiceover is the normal standard, the way that they offer it.

Curiously, audio description plus text‑to‑speech is accepted. I will show you in a minute some chips of what I mean by audio description by text‑to‑speech delivery. And audio subtitling is still pending, of course, subtitling is not fully deployed. Audio subtitling is still there. In subtitling companies we have SDH, it tends to be absorbed by subtitling. So you will have, for example, in the UK, yes, the BBC has 100% subtitling rate, but subtitling is a general subtitling. It's not subtitling for the SDH. Mm‑hmm. Although it is English into English. Mm‑hmm.

But the interesting thing is that in the subtitling countries like the Nordic countries, special care has been taken for reading disorders like dyslexia. This issue of reading slow subtitles, dyslexic people, it does not happen in all the countries that subtitling countries. Audio subtitling is successful, for example in Denmark, they have subtitling and in Belgium, since 2001 ‑‑ or Holland since 2001, and it's been going on. I think 40% of their broadcasting is done through audio subtitling and audio subtitling has to go with audio description. That's the way.

In are other countries we have audio description that everybody knows. We have issues with language technologies. For example, people are not prepared to accept straightforward audio description like text‑to‑speech. People are used to having the dubbing, that replaces the voices an they still want to hear the voices. That's what they want to hear.

They don't understand very much what is the need for audio subtitling since everything is dubbed but we are beginning to have intervening country content on the original language with subtitles and, of course, that's for people who cannot see or read properly.

It would make sense to have audio subtitling. So there as a feed for that, although in these dubbing countries, they say, what for? Okay? And we do have some subtitles but it's not the main issue.

And this is very interesting. English language countries, yes, they do have English‑to‑english subtitles, the BBC is a good example. They don't have audio subtitling. They have audio description and that's very easy. It equates to a dubbing country because it's English into English.

An interesting issue in the US, the second channel on the television has by policy been used for Spanish, because often the Spanish language, as a secondary, you know, voice. It's more important than offering audio description. So when you have to do ‑‑ offer one audio description or another language, they go for another language. So it is strange or it is interesting that a political policy, a language policy, goes over accessibility. Okay?

So we have the languages, and we have the solutions. We have subtitling. We have dubbing, we have voiceovers and we have Eng Lesh. And then the issues subtitling, subtitling for the deaf and hard of hearing, which is different from subtitling. If you offer subtitles 100%, they qualify as subtitles for the deaf and hard of hearing, even though it's not the same. We have audio description and audio subtitling and sign language, which I have put as a solution, even though sign language, it is a language in itself. It's not a solution. Mm‑hmm. Okay?

Now, the evil of costs. When someone approaches ‑‑ you approach someone and say, well, why don't you do this accessible. The first answer is because it's expensive. Perhaps we have to revisit the traditional workflow that we have to make programs accessible, and to see accessibility as part of the production, not as part of the postproduction. This is the idea that has been Heralded by Canadian broadcasters and Canadian universities, and it is the idea of the universal accessibility. Mm‑hmm. So you do include accessibility in the production. It makes sense and it would be much, much chief, but, again, that's ‑‑ that implies education and we have to educate into that.

The use of technologies is going to alleviate greatly in the costs, and, of course, it is not the same to do ‑‑ to do ‑‑ to make accessible the latest film to make accessible last night's football match, Barcelona versus Milan, and only a few people would ever watch again this match, but a movie will go on, or children's television, they will go on. A boxing match, perhaps, is not the quality or the resources that need to be going into the different types of ‑‑ the programs are not the same.

The other interesting or the other way to alleviate costs would be to share ‑‑ to share files, to share format. It translates, if you do the program in English and you do sell the program in audio description in English, and it would be translated, that would be cheaper.

We have noticed there's a lot of duplication in accessible. We make a film with subtitling in Spanish and perhaps in Spanish, they would have up to five times the subtitles, five times paid. I know that goes against some companies but perhaps it would make more and more accessible program.

And the time. The time, yes, usually we have a very short time to make program accessible, to make a film accessible. But if we could think of a rational workflow, like sharing, for example, that could also improve the costs.

The time, the time, it's a problem because if we have to ‑‑ if we are aiming for 100% accessibility, it means that what I am saying right now has to be made accessible. Of course, yes we do have the captions there from Colorado, which is incredible. But it means everything has got to be accessible. So time is an important factor and time will be detriment or at least it will be difficult with quality and you would need someone online to do it or a machine online to do it or a machine and a human to correct to do it. So time now has become an issue of quality and has become an issue of costs, as well. So the two ‑‑ these two things.

So we have the quantity versus quality.

First of all, we have the issue of quantity. All the countries or some countries, at least all countries in Europe, we had ‑‑ the European directives to follow a percentage of programs in a number of years. So we had to follow a program of how much and when we will do the programs accessible on broadcasting, okay? Once you achieve that, the UK achieved that two years ago, it had 100% subtitling and had 10% description and 10% sign language and what happens? A lobbying went on and now they have to offer 20% audio description but the 100% subtitling stays there. You cannot achieve. Once you have achieved the quantity, then the issue is how do you measure quality and that's what we are into now.

And then a problem that is a recurrent problem on the press, is that people complain about the issues of the poor quality of live subtitling, because you have silly words appear, rather than this beautiful ‑‑ this, by the way, is done not by speech recognition. So it is easier to get very, very good subtitles there. The problem is this is very, very expensive. You need someone to have a long training to produce this type of subtitles.

Also, it's not available in all languages. For example, we wouldn't be able to offer this type. So small languages don't have, yes, they don't. But anyway, that's the idea. Mm‑hmm.

So, yes, sometimes in the BBC you get ‑‑ or in some, whatever, the countries that we do have subtitling through speech recognition, you have mistakes like the "Queen Is On Heroin" instead of the queen is on her own. Yes, what a terrible mistake but you have to understand the technology behind it, to be able to understand that it's not such a mistake.

So the conclusions and the recommendations I have is that we have to understand the different traditions, so that the dubbing, the subtitling and the voiceover. We have to understand the language sizes and the technologies available for this. We have to understand the different policies, the language policies in each country to understand how accessibility would be implemented. We have to know and understand the working flows and to think of different working flows to improve accessibility and to alleviate costs.

We have to think that there's plenty of technologies available and some of them are very, very cheap, like audio subtitling, for example, or text‑to‑speech. So perhaps we can use these technologies and then understand that not all programs should have the very best ‑‑ the very best accessibility. So sometimes you can use technologies and the big issue, which I don't have an answer, is the quantity versus quality. To me, quality should be addressed not quality as a number, like 42, just the meaning of life, but quality, as qualities, what are qualities for uses? What are qualities for broadcasters? What are qualities for regulators and see if we can meet somewhere, because otherwise if a user complains about spelling mistakes and broadcasters are worried about costs, we are not communicating. We are not ‑‑ we are not going to achieve anything.

So to me, we understand the different working flows, use and adaptive technologies and share, and understand different qualities and the most important thing for me, even now, is to raise awareness. There is a lot of services on air now, and people don't know that they exist. And participates don't know they exist. Even the governments don't know that they exist. Even their own broadcasters sometimes they don't even know what they are broadcasting.

Sometimes you are on the ‑‑ you are reading the newspaper or you are going online to see if this program has been and you don't know because it's not highlighted. And they are accessible but to raise awareness, it was a conclusion ‑‑ one of the concussions from the European project we had in the past, raise awareness. Peter Long said we should raise awareness and raise awareness is again what I would state.

Thank you very much.

(Applause).

>> MIA AHLGREN: Okay. I can. Thank you Pilar. As this is the first session, I also asked the speakers today to give some small examples even though there are demos later so that we will understand what is ‑‑ what we talk about, and Pilar worked a lot to achieve this request and we will hope now that it's possible to show them.

>> PILAR ORERO: I have prepared 40 minutes that you will not see now. I have prepared 40 minutes that you will see outside later. I want to show you some different accessibility solutions. This one, for example, is the BBC. Yes. Fantastic BBC. And how they display their ‑‑ there are two issues. One the issues is that you see straightaway, the presenter is presenting ‑‑ no subtitles are coming up. Why? Because it's being done in realtime. This is what Christoph Dosch was asking this morning. The big issue about time, the synchronization and also you see the subtitles are coming the same way the subtitles are coming here, word by word. This is not very good for reading. It lows down reading, the reading process and so blocked subtitles are better. So it's just to point out you would see. Okay. Now begins. The guy was speaking for a long time. Okay?

And you will see now a different color appearing for a second speaker. Mm‑hmm.

The idea is that we don't do word‑by‑word on control but we do blocks, and this would aid the ease in the reading. Subtitles, the subtitles, they have lots of issues within them.

Okay?

I did put there why, because to do straight ‑‑ to do live subtitles, you need someone listening to what they are saying and speaking them out. So they are not projected straightaway. As you can see, these subtitles are coming up in blocks. So you have a bigger delay because you have to fill in the whole two lines and then the subtitle appears, okay? So this is why these subtitles come up faster or quicker than these subtitles in blocks. Mm‑hmm.

One thing that not many people talk about, is an interesting one is this, when we have subtitles in a different language, and subtitles are not only used for accessibility, but also for social integration. In this case, the program is in Dublin and the subtitles are Dunn in Arabic. It was trying to get Arabic raised in Barcelona and to get some social integration. So that's an idea. Accessibility not only as simply as a broadcasting issue, but also as a social and as a teaching, as a didactic tool.

This shows how we slow down the production in order to low down reading subtitles and to slow down the reproduction of the video. Why? Because the elderly, they told us, that things are happening too fast on television and they get really, really too much going on.

One of the tests we did in the DTV project four years ago, was to slow down the subtitles and see if people liked them better. If people understood better the slower subtitles and the answer was, yes, they did. So perhaps now with the new Hbb television, we will be able to better the subtitles and offer them. Yes, they do exist and ‑‑ it's very slow, eh? You don't speak Spanish, but it is much, much, much slower, but then you are allowed ‑‑ you are able to read a bit better. Okay?

And the ones that I want to show you now, it's this, which is ‑‑ okay. This was provided by Swiss Text and, in fact, they are doing this online. It is audio description being done through text‑to‑speech technologies. They save on a person having to read aloud the audio description. So what they produce is a file, a text file and then they read it aloud through a text‑to‑speech and I have got two, one in Italian and everybody says the quality is horrible. Well, no, the quality is not that horrible and it's got a positive issue about this, and it is that you identified who is the person who is doing who is the machine who is doing the audio description and it's not one more character in the movie. It's the audio description. It's very easy to identify something is the audio description and the rest is the movie.

And the quality, it's not bad, eh? I got in English as well. Oh, no, that's Polish. Wait.

Oh, here. No sound. The sound is very bad. Sorry. Sound is very bad. I can hear myself.

Let's see if this is ‑‑ okay.

Everybody talks about dubbing and subtitling but what about those countries where they have voiceover. It's a strange thing, right? I have two examples, audio description in Polish with subtitles and subtitle read by text‑to‑speech. It's true and it happens it Poland.

Are you hearing?

Again, this is a film in Spanish with voiceover in Polish, and subtitles as well. We have to take into consideration voiceover and everybody seems to think, oh, no, because it is a big, big chunk. Okay? Yet again. I will show them later to you. I got loads of different examples.

The important thing with sign language seems to be where you put either the speaker at the front or you put the speaker as a little window. Mm‑hmm. This is an important issue and then what we are trying to do now is this, is to have ‑‑ an Avatar. Sorry. Well, yes.

It had to happen, didn't it? Well, I will show you later. I just have the Avatar of children's program an Avatar of a child that changes a T‑shirt according to the speaker and it just does the sign language for the children's program. This is done in HK and they are doing it in Holland as well. I don't know any other country that they are doing sign language Avatars for television. And that is the presentation.

>> MIA AHLGREN: Thank you very much, Pilar, and I wish to thank you very much for putting this demo together, because it's a lot of work to do that and thank you very much. And I think that afterwards, you will be able to see more of the examples.

>> PILAR ORERO: Yes, I have already.

>> MIA AHLGREN: But I also think it important that we try to look at the media, what we are actually talking Baghdad so we are not just using a lot of words.

I think that the next presentation that will come from NHK might be able to show us some of the Avatars that you wanted to show us because we are now moving on to sign language and are Dr. Takayuki Ito from NHK has been the coordinator of working group C, that has been dealing with sign language in the focus group of audio visual media accessibility and we have a lot of very interesting documents from his work and I think you will talk, especially about closed sign language, so the option that you can put on and off the sign language interpreter when you need it.

So I don't know how many years you have been working on accessibility issues, but I think there are a lot of ‑‑ a lot of years, we have a lot of expertise here. So, please, Dr. Ito, the floor is yours.

>> TAKAYUKI ITO: Thank you very much for introducing me, Mia.

I'm from NHK Engineering System Inc. And subject of my topic is not only closed sign but also several issues on sign language service.

First, this ‑‑ you know that sign language is the first language for deaf people, that why they prefer sign language to captions, but here I show you the table which indicates several service rate of various countries, not only use sign language service and closed captioning and audio description. You can see that sign language service is not satisfactory compared to closed caption and audio description, except a few countries such as the UK and Korea.

Providing sign language service is an open signing, and it sometimes called broadcaster mix. You reach the original program and you sign over the video or synthesized or captured in the normal video. Here are a few examples, three appearances of open signing. The first one, this left most one shows signed video in a small round window. And for the sign language users, it's too small to recognize, but it also, for nonusers, the window covers part of the original video. So it's not good for nonusers.

The second the middle one is much better for sign language users, although the window is too small, which shows the main program and the motion of signers may distort the concentration to the main content. That's why for nonusers, it's not good compared to the original video only.

And the third case, the righter most one is natural shot of a press conference, sign language users are happy, of course, and maybe I think for nonusers this scene is a natural scene. So their response may be neutral. At this conference with sign language interpreter, I think this type of sign language, the side by side shot should be used.

I think the production guidelines of sign language service are compiled in the activity and are of an output document. It may be those who ‑‑ anyway, the open signing is a method, not that they are all satisfied. This is, I think, one of the reasons why the signing service does not agree.

If a broadcaster is able to use another optional stream, it reduces the merits of open signing mentioned above. For example, if a broadcaster has enough spectrum, it can us two channels, one for regular programs and the other for those with sign language service. If you have ‑‑ if a broadcaster has enough time slots, it can use spare time lots, such as late night or early morning for those with sign language service. But these requirements are not always acceptable to all broadcasters and to sign language users.

Another method to provide sign language service is closed signing, in which the original program and the viewer receive the streams and are sent through a receiver mix. This this scheme, they are switch on and off the sign language video and control the size on the display screen and both users and nonusers are satisfied in this stream.

There's two choices. Number one is to use an additional broadcast channel, such as a satellite channel, other than the original one. Number two is for Internet, in addition to the broadcast channel.

The second case is so‑called integrated broadcast and broadband system. Sometimes it's called IBB, it's HbbTV in Europe or hybridcast in Japan.

This is a system image of sign language service in IBB. Main program is broadcast and sent to receivers through broadcast, while some of the video is sent through Internet from a broadcaster station or some body.

The case of computer graphics of a signer, they may converted through realtime server in the Internet.

In the case of IBB system, the synchronization, it may include rigid frame‑by‑frame synchronization but the start point and the end point should roughly coincide with main video this is through the compute generation. And so it should be adjusted so that the end point is at the end of the main video. This is especially important when you use computer graphics generation of the sign language interpreter. Computer graphics generation, doesn't take the main length into account. The real interpreter, makes anest to end the interpretation before the end of the main video. Oh, sorry.

Another point of sign language service is an automatic translation from text to computer graphics this happens to enhance sign language service, especially for news at night or emergency at night. Automatic translation is used in limit domains such as weather focused. As closed captioning data is available in most TV programs, we can utilize that data and translate ‑‑ translate to the closed caption text into computer graphics animation of signer.

Here is a view of the system being researched now in NHK. This is Japanese text is analyzed and converted into a sequence of symbols representing sign language words by utilizing the corpus, the corpus means a database of sign language, video and Japanese text.

Then, the UTI, the Japanese and the sign language motion dictionary is signing motion for each symbol it generated such as motions of hands and fingers, facial expressions and so on.

Finally, generated motions are connected smoothly by interpreting them. The corpus and the dictionary is very important to increase the accuracy of translation.

Here is an example of sign language computer graphics for weather forecast. During the regular program is broadcast, you can see an emergency news interrupts it.

Sorry. No voice.

I will try again.

(Feedback).

>> MIA AHLGREN: I think we don't need the sound because it reflects the audience that is not hearing because they only need the sign language to understand.

>> TAKAYUKI ITO: Okay. So the audio, we have audio trouble, but you can see the demonstration of the computer graphics as sign language Avatar.

Japanese sign language dictionary, now, evaluation website is now opened to brush up by getting the feedback from the users. We have opened a website where you can see the content of Japanese sign language dictionary and, the interoperability of each word. Importantly, it is only written in Japanese. So you can't understand the real contents but you can access the ‑‑ this web page through the address written here.

So you can see the quality of the sign language computer animation.

Here, I do have to conclude my presentation. The deaf society prefers sign language service rather than closed caption but many broadcasters, service rate of sign language is not enough.

So I think to increase sign language service, production guidelines is useful and the signing service would be a main service in your future. And also, auto pattic translation from closed captioning to sign language is a candidate to increase the service.

I think I would understand if a promising platform for access service, not only closed signing service, but also some other access services, such as audio description or multilingual closed captions. I think there are technical shires such as synchronizization. Partly, it's discussed in the report of the FG AVA technical report part 10 and the activity of this working group C is documented as technical report part 6.

Thank you very much.

(Applause).

>> MIA AHLGREN: Thank you very much, Dr. Ito and I think that these reports that you are referring to are very interesting and Alexandra would like to say something about that.

>> ALEXANDRA GASPARI: Thank you, Mia, yes, the ‑‑ (Telephone ringing).

The so‑called technical reports will be done as soon as possible in the next week. So the FG AVA website will still be on and it will become focus group technical reports. So the part that Dr. Ito is referring is not on the web but will be. The working groups and all the reports, et cetera, will be available, but they are not now because they were just approved this morning. So we don't know if there were changes or not. So just make a reference. Thank you.

>> MIA AHLGREN: Thank you very much, Alexandra. I think this is very important because the point that Pilar raised before about raising awareness, in these reports there's a lot of knowledge gathered that we now can spread widely when they are on the website and you don't have to register and you can spread them. And I think that's important.

Now, one of the most common complaints to broadcast, I think at least in the Nordic countries, maybe in other countries as well, is that the audience cannot hear the dialogue in drama or in sports commentaries, et cetera. And our next speaker is from Fraunhofer Institute and is Harald Fuchs who has been working three years with this project that he will present on the clean audio and dialogue enhancement, but apparently you are lacking a computer.

>> Sorry, with he have been shifting from APC to another PC. Please bear with us. We have remote participation, so we are using the default computer so they can also follow.

>> MIA AHLGREN: So how many remote participants do we have on board? Do we know? Around ten. So please bear with us as well. And we'll come to the presentation shortly.

>> HARALD FUCHS: Okay. Thank you. The last talk in the opening session, I would like to talk about clean audio. And to start, I would like to ‑‑ to use a definition from the DVD specification to introduce the term "clean audio." So what this is about, the DVB is using three main points to define clean audio. First is this is audio providing improved intelligibility, as an accessibility service, especially targeting ewers with hearing impairments, but on the other hand, this can also serve as improvement for listening in noisy environments, like airplanes or now on the go if you are watching on your SmartPhone, for instance. So this is, on the other hand, also something useful for the channel audience and not only an accessibility service.

So why is there a problem at all? So during sound mixing, you always have to make a compromise. You have to find one fixed balance of the audio between the dialogue on the one hand, and background of music effects, stadium atmosphere on the other hand.

And hearing, for the hard of hearing, they would need a higher loudness of the dialogue, versus the background but also nonnative speakers. If you can speak a language, but it's not your mother tongue, you need a higher signal to noise ratio to be able to follow what is going on the same way as it would be your mother language. There has been some studies about this, and the value of about 3dB would be necessary was the result of those studies.

And, of course, the listening environment has a big influence on the preferred settings. So if you are listening at home, if it's a good production system or if you are listening in a noisy environment with headphones that makes a big difference.

So what can be done for clean audio. I would like to briefly introduce different options that are possible today, and one in more detailed that would be a part of new systems.

The first one that you can do is you just transmit several mixes of the audio. So during production, not only one mix is generated, but several mixes, perhaps one with higher level of the dialogue versus the background, but the problem is that you can only deliver a limited amount of mixes, because of the additional data. You need the same data rate as the main audio.

And, of course, the user is limited in choice so only those prepared mixes can be selected and not an individual mix.

An individual mix would be possible if instead of the mix signal, the original sources would be delivered. So the clean dialogue signal and the background in our case as two separate audio feeds. In this case, everyone could design ‑‑ could decide on their own what mixing level they would prefer, but this also needs more data rate. So you need to be ‑‑ you need to at least deliver two audio streams and this is not backwards compatible so to address accessing receivers, you would need to deliver an additional mix signal. So in total, you need three times the audio bit rate.

What you can do in any case, for every service is a receiver side processing. So for this method, only one audio mix is delivered as today, and the receiver tries to use signal processing to enhance the speech pod of a signal. So in this case, there's no additional data rate necessary and the production side doesn't need to change. But because there's only a mix signal, the ‑‑ the maximum enhancement of the dialogue is limited because it depends on the signal what you can do and you also need more CPU resources on the decoding side to do this signal processing. So the effect using receiver side, the receiver side post processing is limited and depends on a signal. Later on, there's one method that goes into more detail on this option.

And the fourth solution I would like to present is a kind of solution that tries to take all the advantages of the other one and the on the other hand not have the disadvantages. So the goal is to enable the flexibility if you kept the separate sources but without the high overhead on the data rate and the idea is to have a parametric solution that takes into account information from the separate sources but on the transmission, there's only one audio mix and in addition, only a small amount of parametic information is sent so the receiver can change the audio mix better as it could be without those additional informations.

So just one signal flow graph. So on the top, that's the ‑‑ that's the normal signal flow. You get your default mix. You have an encoded audio stream and on the receiving side, you decode it and present it. And on the lower part of the picture, you have the additional parts that need to be added. So this system needs an addition on the production side, and it takes the separate dialogue ‑‑ there's a separate dialogue signal as a second input, in addition to the mix signal, but only for the analysis part so it strikes some information about the speech part and this information is then delivered within ‑‑ embedded within the audio fix stream and this is done in a way that existing receivers just can ignore it. So existing receivers are not disturbed by those additional informations.

But the new one, the new receivers take this information and can use it to manipulate the ‑‑ the decoded mix signal on the receiving side to have higher range of changes that is possible compared to the processing. So it enables an individual mix. So every user can select a balance of speech versus background that he prefers. It has less bitrate compared to delivering the separate sources and it's backwards compatible because there's only one mix signal that every existing decoder takes and decodes and presents.

What we need is we need on the production side a separate dialogue signal. So ‑‑ but that's the same as if you would like to deliver the separate sources. And that's not always possible. Here we work with broadcasters to identify and enrich conditions for what kind of productions this could be possible, how to deliver it through the production workflow and up to the encoder, and an encoder update is, of course, also necessary that is doing this analysis part and extracting the parameters. Here we have worked with one of the manufacturers and had a demo of a live production encoding chain at the last IBC show in September.

Only very briefly about the technology that's behind this. So this is based on an MPEG standard called spatial audio object coding, that exists since some years and we are currently defining a profile for this use case, the dialogue enhancement profile and that's currently ongoing in the MPEG standardization group. And in addition, the DVB will take this profile, and have an advanced clean audio section of the DVB specification for audio video coding for broadcast. So the part of DVB is about the signaling within the transport stream and the broadcast framework and the goal is to finalize this for. Next revision of the specifications of which we'll be due the beginning of the next year.

In addition, to the work with the broadcasters to make sure this can work on the production side, we have also done a listening test to verify that this really works as intended for the hard‑of‑hearing in this case. So we did a speech intelligibility listening test, and the test group was a group of ten people with some medium, mainly age‑related hearing impairments, and we also had, as a reference group, 10 people with normal hearing, the test was a test that is similar to testing the use of hearing aids. You get five words in a sentence that just v no meaning. It's a combination of words and fore every position you have a choice of ten words and you have to select which one, which you have heard and then it's counted and in the end you have a calculation of the the correctly identified words.

So there was the spoken text signal, which rims the dialogue part of a mix and for the background we use two different noise shalls. One was a speech shaped noise that has a similar frequently corrected characteristic as a speech signal. And the other was an applause signal which is the typical background signal of a broadcast program. And the default mix of those both, the speech and the noise was set that you have ‑‑ when you run the test, you have around 50% intelligibility. So 50% of the words identified and the other 50% wrong. So that was the goal to ‑‑ how to set the default.

In the test, it has ‑‑ it came out that the level was slightly lower than ‑‑ than the estimation. So depending on the speech signal, 36 or 34%. And the result was ‑‑ so we first presented the default mix. So this graph shows the results for the speech‑shaped noise signal and in this case for the default mix, you can see the ‑‑ what was it? ‑‑ the 46%. Yes, the 46%. And this was the reference group of the normal hearing listeners. So for the same signal, this group shows intelligibility of 95%, something like that. So almost full intelligibility because of speech enhancement. We have 60dB and 12dB over the default mix and you can see that for 6dB we are already at 85% and at 12dB around 90%. So this is almost the same level of intelligibility as the normal hearing listener. So for this speech signal, we see that for 12dB, we are in the same range of intelligibility and even for 6dB we are almost there. However, if you have a look at the other noise signal, we see that for the default mix, we are at the 34%. So applause in this case is more difficult on noise signal, because also the normal hearing listeners have a lower ‑‑ have a lower intelligibility level, but if we look at the enhancement, we see that with the 12dB enhancement, we are even higher than normal listeners, but the difference between 12dB and 6dB. So for the difficult noise signal, it makes a difference how much you enhance it.

All right. So we can see it depends on the ‑‑ on the noise signal what you need, but one ‑‑ one result or takeaway is that 12dB, it seems to be a level where you have ‑‑ where you can reach actual intelligibility under these conditions.

To summarize, if we are able to enable the audience to change the balance of the dialogue and the background on the receiving side, we can ‑‑ this is ‑‑ this an accessibility service but on the other hand, it's also a personalization or interactive application for the general audience. So this has both sized. And from the accessibility point of view, this helps to improve the intelligibility. There are several options available, how you can do it. Every option has some advantages and disadvantages as presented and the solution that I presented in more detail is an advanced clean audio solution. And it seems if we enable a range of 6 to 12dB for dialogue enhancement this gives a useful range for adaptation of the dialogue to the personal preferences, as an accessibility service, but also to be able to change the setting if you are in different listening environments.

Thank you. And just, I have no demo here during the presentation, but I invite you for a demo that I have on a tablet during the coffee break. Thanks.

>> MIA AHLGREN: Thank you very much, Harald.

(Applause).

I think people might be wanting some coffee, but before we go for coffee and for the demonstration that Harald just advised us about, I would like to ask if there are any questions or ‑‑ or comments from remote participants, for example.

>> PARTICIPANT: We said that we would keep the questions for the end of the meeting.

>> MIA AHLGREN: Maybe it was a misunderstanding. If you have any comments, we will welcome them now.

Any comments here in the room on the presentations?

>> Perhaps the remote.

>> MIA AHLGREN: Here we have a comment, yes.

>> PARTICIPANT: Mr. Fuchs, thank you very much for this interesting presentation. We ‑‑ I would like to very welcome this initiative to improve 9 sector to the noise ratio. I guess my question is, is the intention that the broadcasters or television sets, whatever, they provide a fixed enhancement level a bridge maybe can be done on a shortened notice? Then what I propose alternatively, that it is made as a personal choice in which you can set, depending on your hearing loss, the level of background and foreground speech which would I think be the ultimate solution.

So our standards working in that way, I think that that is your option four to say, or are we going first to see a fixed set of ‑‑ of the enhancement?

>> HARALD FUCHS: So as you said with the selection that I showed at DVB, the audience can decide on the setting, so we have the full option of the individual mix to be selected. The option ‑‑ the option one would also ‑‑ would already be possible since many years but I'm not aware that any broadcaster sends out different mixes. So that this would work in the system today, but I'm not aware of something. So sometimes you have the opposite so that you can get only the background in spots, for instance, that you have no commentary but only the atmosphere, but I'm not aware of the higher dialogue level.

>> MIA AHLGREN: I think we can see, for example, in some countries when it comes to other access services like audio description or so they are sent like that, a broadcast mix in the separate channels.

>> HARALD FUCHS: Right.

>> MIA AHLGREN: The solution exists but for other services, I guess.

>> HARALD FUCHS: Exactly.

>> I have a question for you. In the headphones do you use a similar solution as a clean audio for some headphones?

>> PARTICIPANT: Yes, I do not represent for headsets. I represent for hearing aids. There is, of course, noise canceling techniques on the hearing aids depending on the technology but let as say from one mono source or stereo source, it's not much, because you have no access to the original signal. So when you would have access to the mix, you can make a tremendous improvement as Mr. Fuchs shows. And I think that even in the long run, that I would say that, let's say from the ‑‑ from the hearing aid having wireless access to a movie or a television set, that it's even watched by more people, that those peoples in some way, should buy signaling or to the transmitter of the ‑‑ of the audio and background noise can set the optimal setting for that because a lot of people have, let's say, medium hearing loss, and you have this advantage of secondary noise and I think a lot of productions are made for young people, and even which amount of background noise they may produce, which ‑‑ which ignores that you also have to follow the conversation.

So I think you have also as medium levels of hearing loss, you already can benefit a lot of that for that, just for your comfort, but if you are hearing impaired to a higher degree, or absolutely depending on, that but my point is it may have different levels of this enhancements, because when you have a hearing loss, you still like to profit from the background noises but in general a lower level. That can be fine but when you have severe loss, are I think you would only like to have access to the conversations because that is your essential point to have.

So my plea was a bid in which we can personalize for the level of hearing loss.

>> MIA AHLGREN: Thank you. I forgot to say we should use the same, because it's easier for the transcript persons. I think it was Marcel, right?

>> PARTICIPANT: Any name was Marcel Flaming.

>> MIA AHLGREN: I think we have a comment from our remote participants. We have Kate Grant, can the speakers comment if broadcasters who provide this fixed quantity of signed programs when broadcasts, are they expected to provide similar over Internet, for example, on demand broadcasts?

>> MIA AHLGREN: Does anybody care to answer the question? I think if you have a quota for sign language on broadcast television, do you have the same quota for ‑‑ for Internet?

>> PILAR ORERO: I have an answer to that.

The quotas are only for broadcasts. On IPTV, there's no legal regulations in Europe, at least.

>> MIA AHLGREN: I think to be honest, I think it's quite different in different countries. The European regulators have a network and they recently produced a report on the different regulations in the countries and there are some countries that actually have quota for ‑‑

>> PILAR ORERO: For IP?

>> MIA AHLGREN: For Internet.

>> PILAR ORERO: Yeah?

>> MIA AHLGREN: Yeah, I think we have a link to that on the website.

So any more questions?

Then, before going to coffee, because I think it's 9 afternoon, so we can drink coffee here and I hope our remote participants also can have the possibility to take on coffee, I would like to conclude I think that we have listened to some interesting discussions on quality and I think the debate on quality will continue on all the services represented here today and that will be something to talk about in the future, because there are existing solutions. We found several examples that are all existing solutions, though they are not available everywhere.

And in the future, I think we look forward to universal design of access services or even media services that would provide more options for the users, and, of course, we also heard examples from the importance to have a user participating in tests to know and define what is quality, that is different from different perspectives.

So thank you very much. Thanks to all the speakers in this session and I think now it's time for coffee. Thank you very much.

(Applause).

>> We will resume at 4:00. Thank you.

(Break)

(Break).

>> LINDER GION: Hello, everybody. This is now the second part of session 1, and I think even though some of the participants here are still taking coffee, we would like to proceed. I think Alexandra has some information about the organisation.

>> ALEXANDRA GASPARI: Thank you. Just a small point of housekeeping again. So we have booked provisioning some tables at the local restaurant tonight. We said this was in the morning for the focus group but if there are participants would would like to join the group, just let me no after so we can accommodate your request. Thank you very much.

>> LINDER GION: We have one hour for the part two, and, again we have three presentations. So we have to be a little bit shorter than the former session. And there is a slight chance as Christoph Dosch, who was planned to be the first speaker will be the third one and that's why I hand over now to Taka who is going to speak about speech signal processing for media accessibility.

Taka, the floor is yours.

>> TAKAYUKI ITO: Thank you. I thank you very much. Today I would like to talk about speech signal processing for media accessibility. As you know, aging is now a global issue, the population of older people is increasing and maybe because of advance of medical care. In the world, I think Japan is the number one country in aging. Here I show the table in 2010. We had one‑fourth of the population of elderly people, and in 2040, more than one‑third, if the elderly. So maybe I think in this room, I will live longer than all of you.

(Laughter).

Are you happy on that? I'm not sure.

But anyway, in such a society, the younger generation alone may not be able to support elderly people and therefore part of them who can continue contributing to the society should be provided such opportunities. So from supportive to supporting.

At the same time, we need to consider various degradations of functions happening in the elderly. For example, hearing loss in higher frequencies is generally observed in elderly people, and hearing aid is usually used to compensate it. It is also observed that elderly people find it difficult to understand the speech under the noisy background sound, which was discussed by Mr. Harald Fuchs in the previous session.

So this is also true in the case of broadcasting programs, and broadcasters sometimes receive claims from elderly people that video is too loud to understand the main speech. The third one is maybe because of the degradation of the cognitive processing speed in the brain. Elderly people can sometimes not catch up to speech if fast speed. We broadcasters also receive claims from the elderly people.

Compensating these degradations makes easier for their participation. In this, I pick up the second and the third functions.

The first one is speech rate conversion technology. As mentioned, about we broadcaster sometimes receive claims from elderly people that recent speech on the TV programs too fast to understand. From such claims, weekend find the need to slow down speech rate without degrading sound quality. There was a certain technology that was already commercialized as a function of a TV set, and the radio receiver. The basic idea of changing speed of speech without changing tone is to remove the waves corresponding to the voice speech. This processing makes quite a difference from linear stretch or shrink of waveform.

Here is an example. First, I will show you the original sound.

>> Taka, do you have any plans for Saturday?

>> No, not at all. No, none at all.

>> TAKAYUKI ITO: This is the original one.

The next one is an elongation.

>> Taka, do you have any plans for Saturday?

>> TAKAYUKI ITO: It's like a tape recorder, where you can hear this type of sound. In the case of the processing, I mentioned, we can slow down the speech.

>> Microphone.

>> Do you have any plans for Saturday?

>> No, not at all.

>> Well, how about visiting an art exhibition with me.

>> TAKAYUKI ITO: Or you can change it. You can change it without changing the sound quality.

So in the case of TV programming the links of audio should consider ‑‑ or should coincide with the data with video.

So realize this, we reduce the length of Beth intakes to recover the increase in speech length. Here is an example.

The first one is original.

(playing video).

>> TAKAYUKI ITO: And the slow down.

(playing sound clip).

>> TAKAYUKI ITO: You can see the ‑‑ as you can see, the waveform, the speech segments are elongated and they are silent segments are a strength.

The speech rate conversion is originally developed for elderly people, but it can be applicable to many fields as you can convert the speed to faster in the case of recorded data, it can be applicable to audio skimming for visually impaired people.

Audio skimming is a method which visually impaired people use. It means they sometimes will replay audio materials in three times or more faster speed when they want to find a main idea rapidly.

If you apply this speech rate conversion, you can get faster speech with a better intelligibility because it utilizes not only the following silent portion, but also leading silence or here again, I will show the example.

>> This case, the original ‑‑ (Inaudible).

(playing audio clip).

>> TAKAYUKI ITO: Using these functions, the speech conversions, it helps in many fields shown here. It is utilized in various styles, such as a SmartPhone application, here, and we developed a plug‑in for maybe a player in EC or installed in A player.

We will demonstrate an iPhone application for language learning.

The next one is a clean audio. As mentioned in the second slide, in the elderly people feel that the background noise is too loud to understand the main speech in the TV programs. If we can get dial to control loudness of background, or speech enhancement switch, elderly people feel much happier when watching TV. There are various methods to realize this function, and we analyzed merits and demerits of various methods presented by Harald. And what I will explain now.

For detailed information, I think you can find FG AVA technical report.

Here is a diagram to realize clean audio developed in NHK. A feature of our technology is that it is receiver side remixing with no retransmission. It separates speech from background by utilizing the stereo correlation filter. So it ‑‑ the estimated speech component is enhanced in spectrum space to obtain, speech. It's changed by remote control. Here is a demonstration again.

First I show you ‑‑

(No audio).

I will show you the demonstration result. Then I think I need to wrap up my presentation. I think the social participation, and the speech rate and clean audio are promising technologies for these purposes. Broadcasters or TV manufacturers are encouraged to provide service or the device with these functions. For more detail, I think FG AVA technical report, you can find various comparison of various methods realized ‑‑ to realize these functions. Thank you very much.

(Applause).

>> LINDER GION: Thank you very much, Taka. And now the floor is open for Mike Starling who is CTO of National Public Radio and the research center. The floor is yours.

For the remote participants, we have a PC problem. We have to wait another 30 seconds.

>> We have a PC opportunity.

>> MIKE STARLING: Okay. Thank you very much. I appreciate the opportunity to come and speak to you today about the project we have been working on for several years at National Public Radio. I'm presenting on behalf of my great colleague, Dr. Ellen Sheffield, she's the partner at Tosend university. She came from industry first and then went to Towsend. She used to work at Bell Labs doing research for them. So this is a project that we have been working on for probably five or six years now and is finally at fruition.

First of all, a little background, public radio in the United States was only established in 1967, with the passage of the public broadcasting act. And immediately in that act was guidance, policy guidance for us, that we should achieve full national coverage. So we spent the next 40 years roughly working on doing exactly that, with geographic coverage and you see here 9 reach of our network of stations. They are about a total of 1600 stations all together so public radio serves and it reaches a little bit better than 95, 96% of the population.

The holes that you see there are mostly just prairie dogs and cactus. So there are not too many listeners among those populations.

But it turns out that we discovered that this is absolutely false. It occurred to us recently that we have been working on the problems of geographic reach, but not working on the problem of inclusive reach. And so naturally those would are deaf and hard of hearing that cannot use the radio have been locked behind a sound barrier and have not been able to receive our services. So our actual coverage is probably more like 85% when you include them, and take them out of the territorial coverage that we have here. So that's something that once it came to our attention, we got to work on and I'm happy to report that captioning for radio at NPR has started. Our first program was a show called "Latino USA" it began transmissions with captioning on the 22nd of February of this year. And the reason that they wanted to be first was because there's a documented higher incident of hearing loss among Hispanic children in the United States. No one is exactly sure why that is true, but it's well documented and <!2048> therefore said we want to be the first show and they were. Naturally, what we are trying to do here is to replicate the radio service as a whole. So emergency alerting support, including with bed shakers for emergencies in the middle of the night needs to be part of this program and we would be remiss if we didn't thank our colleagues at the Department of Education, the national institute on disability rehabilitation support for funding many of our developmental efforts here.

So NPR, as you may or may not be aware, is primarily noted for radio journalism in the United States. We have a very successful listening audience. It's about 34 million people every week tune in to it. But, of course, in radio journalism, unlike television, we don't have visual cues to rely on. So speaker and place name identification are extremely critical to understanding the context to breaking news. Localisation and customization are needed to replicate the radio experience and, of course, radio operating budgets are a fraction of television. In general, if you use the guidance from the corporation for public broadcasting as an example, radio budgets are about 25% of the television budgets. So we have much smaller funds to work with and so we are very cost conscious about the solutions that we will employ.

This is an example of a demonstration of the presidential captioning last October, just a year ago. And you see that there's affinity noted here with the linkage to WNYC. This particular debate was nearby in Southampton and, of course, we pulled up the local weather icon projection for the day, and we have a place here for an underwriting little banner thumbnail, and that's the basics of it.

We had tested this particular black‑on‑yellow many times throughout our projects and found that that worked pretty well. We also agree with some of the earlier presentations that it's preferrable to put it up in large blocks as opposed to having words appear one at a time.

As soon as we began working on the caption radio demonstration project, our colleagues at the Helen Keller National Center for the Deaf Blind cropped up and said, what about braille? And we said, yes, what about braille? Now that we are creating text, we certainly ought to be able to do the braille output. And what you see is what has been tested here with the American association of the deaf‑blind on sort of the recreating the radio experience, but feeding refreshable braille displays. I think it is from Humanware and there are many other companies around the world make these braille displays. And as a part of the 21st century communications act that was recently passed in 2010, in the United States, they established a national deaf‑blind equipment program that provides $10 million every year to the Federal Communications Commission to provide these refreshable braille displays to youngsters who are deaf‑blind so that they can learn to use refreshable braille while they still have the neuro plasticity to acquire that language rapidly.

Here is a look at the caption editor that was part of the system that it took us about a year and a half to build the software and to test the system that we created and this was the end result. We use voice writing. We got that idea from both the BBC and spinoff company that they had, Red‑b media and seeing that it was being used at the NHK in certain circumstances. So we studied the problems that we had about it in theory, and realized that naturally, you would need to clean this up. No speech‑to‑text system will come out with really clean output, at least not approaching 100% accuracy. So we have to have a caption editor sitting on the output of the system, and this is what they are working with.

You see that we have 10 characters along the top corresponding to the home keys on their computers. So they never have to waste time and reach over to use a mouse. Instead they type simply the character and scroll down by the row, make the correction in that particular cell, hit enter and go on to the next one. They have maybe 5 seconds to correct any errors that are in the middle of the block.

I will see you if we can show this. I think we tried this before here, and it wouldn't run.

So we have to come out and ‑‑ thank you for your assistance. We need to, I guess, turn that back on. Hopefully this should work ‑‑ should we wait for our assistant to show up?

Hopefully you will be able to hear this, but don't worry. If not, it is, of course, captioned.

(Chuckles).

>> MIKE STARLING: Hopefully you got a good sense of what was going on there. So let me talk for just a moment about the emergency alerting use case. All of the conversations that we have had with the users stress how important it is to them to have emergency alerting information available immediately, the same as it is for their hearing colleagues. So we're trying to recreate the radio experience but without the sound, of course. So just like with a regular alerting emergency broadcast, we interrupt the broadcast, the deaf‑blind brailler, they have to read the message before they can resume listening or reading the radio, if you will. The advantages here, of course, are numerous. This can be stored for later review. In the message says, you know, evacuate immediately, go to this sheltered location, they can take their device with them and replay that message at will. Of course, they are using USB triggers. We can fire off 9 bed shaker and the folks at the Department of Homeland Security, the Federal Emergency Management Agency, which is inside of Homeland Security asked about, can we send special messages in other languages? We have, of course, many, many languages in the United States, as well as braille. And there have been some notion that specific evacuation centers that would support people with sign language needs and ones that would accept service animals would be great specialized information to send on this specialized emergency alerting for those with disabilities and naturally, thanks to modern digital technologies, we can now geo target those messages so we don't have the crying wolf that you are waking up to many people in the area, just in the area that you are trying to reach.

Here's an example of what went on during Hurricane Katrina. This was a picture captured by one of the reporters covering and your men were covering to a Super Bowl evacuation center and had been stopped by the friendly police officers and they were attempting to explain that they were deaf and that they had to sign and read lips, and, of course, if they had better information on the approved routes to get to the evacuation center, they maybe could have avoided that situation.

This is a unit that we have just created. We heard earlier the excellent prognosis about using integrated broadcast services and that's exactly what this is based around. This uses an Android tablet. This is a department we have the Department of Homeland Security in 25 cities in the five gulf states. This is what the end unit looks like. This attached to RDS, which is made by Katina radio service. They won that contract and this is a sample of what the end users will have. We'll send out 500 of these and then test their retention and recall of the messages using a variety of formats to test the useful necessary of different templates for emergency messaging.

And we just got word that they received an engineering design award. So anyone coming to the international CES in January, come and see it there.

So much of the conference is about how do we make this sustainable? As we all know, you know, you can't do good work unless the numbers work and so we have been working hard to make those numbers work, and we're pleased that we now have a voice writing system that's giving us 98% plus accuracy. Much more consistent output than what we typically see ‑‑ I would be remiss to say that the captions today are absolutely exquisite. These are probably the best captions I think I have seen anywhere, and every day at lunchtime, I sit in our cafeteria and I look at the news broadcasts that are on the air from CNN and elsewhere, and typically the captions are just abysmal. It's very difficult to make heads or tails of much of the content. But if you had Caption Colorado working for you, I think you would be doing fine but if you don't, our system seems to work quite well, and as was noted to get people the caliber, I think that we find at Colorado, they have to invest a lot of time and some funds to gain that level of proficiency.

But with our process, only two months of training time is required. We use a battery of screening assessments, homonym test, language, punctuation, and a host of others to see would has the right aptitude. It turns out it's only about 1 in 10 people that have the appropriate aptitude to be a skilled voice writer. And we can clearly identify them now, just about all the time, once they passed our test, we know it will work out well.

So our result is an efficient process that works well for radio media because we can bundle transcripts, as well as captions.

So in the United States, we have the advantage that we can talk about underwriting mentions, and that they more than offset the costs, you know, captioning brought to you by Swisscom or Verizon or frequent commentaries that we will have with each of our big broadcasts, and by bundling the process together, we save about almost half of the cost on transcriptions.

We have discovered that ancillary revenues will help to support the captioning center from academia, disability support groups exist on every campus, and increasingly campus events, you know, the President speaking thinks of that sort, the commencement ceremonies, they want to make sure that those are captioned as well.

So you saw the little screen that had the radio station affinity and there's a little spot that they can also add a little underwriting spot so that they can build the connections in anywhere communities with this group that's never been able to listen to radio.

It's an agnostic technology. We have had good success, in ITU‑R thanks to our friends in study group 6. I see our chairman in the audience. So we passed, I think it was in 2011, BS1894, the caption radio standard that shows the mechanism where all the five of the digital radio systems in the world can support captioning for radio. But, of course, Internet technology, thanks to the advent of ‑‑ of tablet devices is a perfect medium for transmission. It gives us the advantage that we can synchronize text with time text markup language and so with about 15 to 20 seconds delay in the audio, we can now lock the text that's coming out so those who are heard of hearing still get some auditory reinforcement, and it improves the listening experience for them.

So globally, radio's robust, mature and part of community life and everyone should be able to rent joy it and it's highly resilient, especially when the power grid is down.

So in the future, we believe that all audio must become readable audio. And we hope that our little project, might shed some light on one method of being able to do that. There's the contact information for myself and my colleague, and I thank you very much.

(Applause).

>> LINDER GION: Thank you very much. Now it's time to go to Christoph Dosch. Meanwhile, Christoph is here and we will talk about integrated broadcast, broadband system to provide access service. Christoph?

>> CHRISTOPH DOSCH: Good afternoon, ladies and gentlemen. I have to apologize for not having been with you in the beginning of this section. The reason simply was I'm attending at the same time, the meeting of JCG4567 that's running in IPR in one and a half weeks. We are approving the last documents and as study group 6, I to attend this session at least part time. I just ran away and in order to cover the issue of interference from mobile broadcasting system. So thank you for that comprehension.

This afternoon, I'm speaking about IBB system, integrated broadcast broadband to provide access services and one of the two systems, Dr. Ito already said this in his presentation, in the first session is HbbTV and the other is hybridcast from Japan, and I will talk a bit more about HbbTV because that's a system I know.

The IRT, that's the institute I am working with, is the core organiser of the HbbTV association and is one of the cofounders of the association and has been involved in the development of HbbTV right from the beginning.

Okay. So going digital is really a big help. We had a discussion at lunchtime that some people still have analog television at home and it would be so much easier for them to have better access services if they were to switch to the digital service. And that's what this slide should tell you, because if you go digital, you have an improved presentation, and you can adapt to your individual preferences, and you can use a hybrid delivery system.

IRT is working on HbbTV. I refer to you to BD‑2267. You can download it from the ITU website free of charge. And yeah, here we go. That report has just been compiled and finished in April this year, and it will be updated with time. The existing television for people with disabilities is something that needs to be distinguished between open and closed but that's an issue we have been talking about already. In the production of access services, we have to think of including these possibles right from the beginning. Preproduce as much as possible and do live as possible and there's mixed product, especially live production, you have pieces of video that are cut into live production that can be preproduced, and with respect to the transport and the presentation of access services, there are two possibilities, either everything within the broadcast system, that's also possible with HbbTV so HbbTV content does not have to come over the IP network. It can be included in the data carousel of the digital television signal.

And normally, you have a mixture. So the most important pages of HbbTV are included in the broadcast signal, and the video that retrieves additionally or any other services that are currently not contained in the multiplex are then retraced via the IP connection.

The specification of HbbTV is currently an ETSI specification. You can also find it under HbbTV.org and the important message here is that HbbTV does not depend on the particular broadcast link, nor on the particular IP link. So it can be associated with any digital broadcasting and any IP link is okay, and so it could be wireless links. It can be Wi‑Fi. It can be UNTS. It could be LTE, it can DSL. It can ‑‑ yeah. LAN system. So any IP system can be used to connect. So definitely as Dr. Egar has shown, it has an antenna input, or a cable input and an Internet input.

There's a research project going on that's called HBB next that deals a lot with the ‑‑ for the further development of the specification towards what we now call version 2.0 and that ‑‑ if you go to that website here, you find enormous amount of information and also we have the demonstration outside by the HBB next project. And this project does a lot in order to enable access services for people with disabilities. This is the outlook for HbbTV 2.0, but I don't want to read all of that. It the important thing is the adaptive streaming.

I understand all of the slides will be put on your website.

How do you start? You push a button, a red button on your remote control, and you get here this starting line. You can see this outside life and then you can select the additional services you would like to have, for example, the weather or the news or the EPG, and you can also have information from a different broadcaster. This broadcaster is coordinating.

So you can seamlessly tie linear and nonlinear services to go and this is a way we can apply access services for everybody.

And now a few examples, subtitles on command, we did that demonstration at the international raidio in Berlin. It can applied already. The synchronization works. We can show that outside but it's not yet specified. So we can have frame synchronization between the IP signal and the broadcast signal. The interesting thing is here, if you select your subtitles, you can have ‑‑ you then have the possibility to adjust your subtitles in size, in appearance, in position. It's up to the broadcaster what features are allowed.

I will show this to you in the demonstration I am providing. That possibility of changing and changing color and changing size and changing background, color is also applicable to the EPG or to the teletext. Here is an example for video text. For example, this is the default position. It is dark and lighter blue. Some people have difficulties to distinguish these two colors and so you can easily adjust that to be white on black or yellow on black or red on green this is just a question how to render that information in the receiver. You can also have different sizes. You can have that size. This normal size, or if you make it bigger, you have a bigger font and you can read it from further distance or you can read it more easily.

Another example is the signer video. We have talked a lot about signer today that's streamed over the Internet and superimposed with the broadcast TV signal. So if you select the signer, the main video signal is made a bit smaller and the signer appears and then you have the possibility to push the signer on the top or the bottom or in the center, make it small, make it big. And that gives ‑‑ these, again, are your personal preferences.

You will see in the video, I'm showing.

Very interesting feature is to combine the HbbTV functions with the second screen. What is the second screen? The second screen is your SmartPhone, a second screen is your tablet. The second screen is your iPad or your laptop. Any display that allows connection to Internet can be used, as a second screen. And so you can have two different informations. You can have the main program here and the retrieved content there on your ‑‑ you can also switch between the two. You can shift it here. And that is very useful if you have found something you want to show to your family, for example, or your friends. It's also very useful for subtitles, which you would like if people have very difficulties would like to be closer in order to read them.

It is extremely useful for audio description because in that case, for example, here you have the teletext information on the second screen, and the main broadcast video on the main screen. You can't connect your ear phones to this tablet and then you can ‑‑ you can connect your ear phones to this tablet and then you can have the audio description for just that person in your family that needs the audio description. The audio description is critical in time because it has to fit into the gaps of dialogue of the main program and that's a demonstration we showed at IIRT. Unfortunately that demonstration is not available today.

How do you connect a second screen that you can see this also outside. It's very simple. You push the button that you want to connect the second screen and then this QR code shows up and that QR code is nothing else but a you will which is given here. So in principle, you can type the URL. You open the browser of your tablet and now these two devices are connected and show the same image and now you can switch the images between the additional information and the broadcast information. It's very simple. Let's have a look.

So to conclude, the access services for people with disabilities ‑‑ we always say accesses for people with disabilities that is wrong it's access services for all of us. For example, my wife loves audio description because it tells her the story and then she doesn't have to look she doesn't have to watch the image. So she's working. She's ironing. She doing her household work and if it is a daily soap, she knows all the personalities. She knows from the voice, from the speakers' voice who is speaking and if the audio description gives her the additional information, what is happening, this is like an audio drama. It's also useful for if you are in a car, for example, you have to drive, you cannot watch the image, but you can listen to the audio description. So there are many possibilities that's only one example. The other example is we had this today already, with subtitles, not only for hearing impaired people. Of course not.

Also for minorities, for who can understand much better the dialogue if they see the written text and for children to learn foreign languages and so on. The same story of the Finnished children who are best in the Pizon test. I don't know if you know what it is. It's a competition between the European countries concerning the school education and the Finnish are very, very good. They are especially good in English and the reason is very simple, because the Finnished TV program not dubbed. They have subtitles the the children have two possibilities. They have to learn to read very quickly. They have to learn English very quickly and by reading the subtitles they learn English, how to write English. And so this ‑‑ and how to write Finnish, excuse me. So this is very helpful for all of us. There's perhaps one little exception ‑‑ not little, but important and this is the sign language which is really only applicable to those far whom it is their mother tongue.

So in conclusion, the services are of benefit to all of us. There's enormous potential of integrated broadcast broadband TV and I'm sure once it is ‑‑ it is on air, by the way. It is operative, the system. So once it is really used to a large extent, we only have 3 million receivers currently in Germany. Only 3 million already in the mark used. Used. Connected. Then I'm sure people will invent the ‑‑ the creative people will invent marvelous possibilities, new possibilities for multimedia accessibility.

We need to produce cost efficient. So we have to take the in production into account that we have to deliver access services, and we need to have them at good quality. We discussed this this morning, that in the final working group meeting, in the final focus group meeting that we need a matrix how to ‑‑ a matrix how to judge the quality of access services.

So the idea is make it main stream. Don't make it specific to special equipment, allow it for all equipment and the tester control, or the voice control of today's modern television is already a step in exactly that direction. So that everybody can make use of these systems that are available then to all of us.

So the cooperation between the consumer equipment, the manufacturers and the broadcasters should continue. That's one of my further conclusions, and we have to develop the appropriate applications for hybrid broadcast, broadband services. And we have to encourage the broadcaster to do so, especially in the developing countries, because this is really helpful, and with all of this broadband initiative that's currently going on, I think that is a prime means of delivering education and health aid and so on to the public.

So that's all. Thank you. I will just now try to show you the video and I have prepared. Here we are. Now it's not working. We had that before. I'm sorry for that. I have to close it and restart. Otherwise it doesn't work.

I have no sound. Nope. We have my sound.

Yeah, we have sound.

What you see here is that you can switch on and off subtitles. You can adjust for the subtitles the size, here, or the background and the position. And that is the information what to do in case you have a problem. Let's continue.

You can have it white on black, or you can have black with white letters an you can have subtitles on the top or the subtitles on the bottom. The broadcasters can offer more options. It's just a question of how you program this website, because this is nothing else, but a website. Just let's continue.

Now we are switching the sign language on. We can switch it on, sign language, on or off. You can adjust the size or the position. And this is what we are going to see now. So in the end picture, you will see both sign language and subtitles and video and audio.

(Playing video).

That's it. You can have a live demonstrate outside between now and 7:00. Thank you for your attention.

(Applause).

>> LINDER GION: Thank you very much, Christoph. I have good news, we have ten minutes more, at least, for questions.

First, I want to ask Alexandra if someone remote has a question. No questions so far. So someone on the floor has a question? Please.

>> PARTICIPANT: A question for speakers about you maybe for Mike Starling, in particular. Because video has become so popular on the Internet, when they are captioned with the captioned file, do you see any business model that would be leverage the files once they are captioned?

>> MIKE STARLING: Yes, absolutely. We have had a number of requests for that kind of service and then we had software that will synchronize the captions to the frames of the video. That is part of what we're working in collaboration with our digital media team at NPR to do because they have some videos on our website as well. So, yeah, I would say lots of people like the idea of being able to search, and then link immediately to that point in the video, or the audio in our case.

>> LINDER GION: Questions?

>> PARTICIPANT: Good afternoon, Peter Lums. I have a question for you, sir, about captioning for radio. I was wondering have you encountered any resistance or reluctance in connection with the kinds of things you were doing from the holders of intellectual property. I was thinking of a case a couple of years ago in connection with captioning in which the captions includes ‑‑ included the lyrics of songs. I can imagine that that could be a resistance in certain quarters at the recent conference at WIPO, I think an accommodation was found for ‑‑ for those with visual impairments, those who are blind, but the original audio two years back of have the whole gamut of individuals with impairments never came to fruition. So could you share with us your experience thorny issue on intellectual property?

>> MIKE STARLING: You raise a terrific issue that at least in our immediate application of providing captions for the NPR program, we have been fortunate to be able to side step because we produce all of our content. So we own the intellectual property for it. You are correct, in the occasions when we might have a music artist on, and we would want to have the lyrics, we would have to have their individual permission, and at least in the US copy right law, I'm also a lawyer as well as an engineer, but in the US copyright law, there's an exception, a categorical exemption to copy right law if it's intended for the blind and I think they have a similar exemption for captioning for television, but it doesn't appear it applies to radio. So we're not sure what the conundrum will be when it comes to be attempting to caption lyrics but we know that it's lurking out there and at least for, you know, 99 plus percent of our content, since we produce it and own it, we don't have that direct issue, but there probably will need to be some legislative attention to that, and I think that the disability groups in general have very strong support in the Congress for anything of this sort that they need. I would be surprised if they couldn't get an exemption, at least in US law, if it proved to be necessary on a blanket basis, like what you point out with the lyrics.

>> PARTICIPANT: A brief comment is that, for example, in Scandinavia, if you can't have it through national or European legislation, you can write ‑‑ actually write standard contracts and use generic provisions in contract law.

So for example, when we started providing audio captioning, that's spoken subtitles we would call them. The contracts with third parties were changed so that you asked up front for this, and I think with some firm pressure, you can often achieve this, in fact, you can often shame people in not charging even more money for particular rights, because if they were seen to be doing that, maybe it wouldn't be in their best interest when the public heard about what they were actually asking for. So if you can't do it in, you know, regional international legislation, maybe you have resource to contract law.

>> MIKE STARLING: I suspect you are exactly right, and I know you are right when it comes to the National Association of the Deaf, in particular, is very active on the legal front and has gotten a number of consent decrees recently, mainly with large venue public events, sporting events, things of that sort, and I suspect that if we have problems with any of the content that we're producing, that they might rally. They see it as a matter of civil rights, and they do not generally go away if the first answer is it's too complicated. They have been very successful at arguing that case, and I hope that WIPO will endorse. We put this forward through our broadcast union and I will let you know that we were the only broadcaster to insist that there needs to be recognition of all of the common exemptions and exceptions for fair use and disability support, and many others didn't necessarily want that full range of complications, but at least in our case, we think it's a matter of good public policy.

Thank you for raising the question.

>> LINDER GION: More questions? Alexandra?

>> ALEXANDRA GASPARI: Thank you. I have two questions for Mike. The first one is the following: In emergency situations, through natural and man made disasters, you are going to broadcast the message in English and Spanish?

>> MIKE STARLING: It will be in English initially, but we have been asked to work with FEMA on how to produce it, at least in Spanish and heavily Spanish language speaking regions. So I think we may explore, that but we don't have any magic solution on how to get that done.

>> ALEXANDRA GASPARI: Because I was also wondering, and the second question, how do you ‑‑ since it's a ‑‑ how are you linked with the bed shaker? So you have English and then you have the Spanish and then you have the bed ‑‑ how can you do it in the short ‑‑ I mean, it's a big challenge, the shortest ‑‑

>> MIKE STARLING: Yeah, the bed shaker fires off first, the commencement of the emergency announcement to get your attention and then immediately the radio receiver or the tablet, in this case, will begin to store the message as it comes in. So if it's trickling out in braille, you can back up to 9 very beginning of the message and that's the way you are expected to use it.

And it will be stored as well for later playback if you need to review any of the information again. I think you raised an excellent point on seconds matter. We have talked about that and, of course, with 15 to 20 seconds of delay, in the creation of the captions, that's 15 to 20 seconds that might could make a difference, in some situations. So there we are working on standardized formats for the emergency alerting messages. So minimal input, minimal data has to be entered about where it's occurring and the message is ready to go as they see the events unfolding, so that it can go out immediately without having to be transcribed and repeated. You know, we are trying to be sensitive to that, but the proof will be in the pudding as they say.

>> ALEXANDRA GASPARI: Thank you.

>> CHRISTOPH DOSCH: I can give you the information that we have just finished the work on a protocol in Europe and that's called an alert for all, and that is a machine readable protocol that we use for traffic information in TMC or in TPEC. That protocol is retrieved by the broadcasters via that service and it's immediately inserted into the data carousel, as an HbbTV service with auto start function.

So as soon as it is in the data carousel, the TV receiver will show that information as an HbbTV page and for the user, it just ‑‑ it's an insert that appears and as it is the machine readable, it is ‑‑ you can depict it also on a map. You can also translate it into any other language. So you can have the message in Turkish, as we have millions of Turkish people in Germany. You can have it in English and in German, French and so on. So that ‑‑ the technical ability has been shown just two weeks ago. I was at the final workshop of this project and it's now up to the standardization in Europe to adopt that solution. Yeah so it will take still a while before that is common practice, but at least we have a basis on which we can use the HbbTV technique for alerting the population.

And as we have just heard, there's a technique for the radio, in principle, a similar technique with coded messages. So at the end, I think we are really coming close to the realization of alerting the population via all media delivery paths. Thank you.

>> LINDER GION: Thank you, Christoph. Some members of the focus group were last year in Japan and I remember that ‑‑ I think Taka, you explain the death rate among the deaf people after the Fukushima accident was much higher than among ordinary people.

>> TAKAYUKI ITO: Yes, this is Ito from NHK. In the great earthquake, not the Fukushima accident caused twice as much higher death rate for the physically impaired people, including visual impaired and auditory impaired people. Yeah.

>> LINDER GION: And, well, I have also a question. Taka told about elderly people which comes often with multiple disability and I see often elderly people who are not even able to ‑‑ to deal with a remote control. So my question goes to Christoph, how can these people ‑‑ well these people be able to cope with the HbbTV technology?

>> CHRISTOPH DOSCH: It depends on the disability, but as long as you can push a button, yes. Yes, the own thing you have to do, in order to request information is push the red button. So if people can detect the red button on their remote control, they can call for the HbbTV service and then they have a large pop‑up menu where they can navigate with the cursor to the right, and to the left. And then they push okay, and then that page pops up. So it is really super simple. Of course, if somebody has motion problems, then we have to count on speech control or on motion control by hand motions, like in the kinetic system.

>> LINDER GION: Thank you very much.

Now this concludes the second part of session one, and now I want to hand over to the workshop chair, Seong‑Ho.

>> SEONG-HO JEONG: Thank you very much. In particular, I would like to give a special thanks to all the session chairs and presenters for the excellent work and very interesting presentations.

So far, we have listened to several presentations and we hope you enjoyed the very interesting discussions today. I think it's time to wrap up today's sessions. And I believe, there were variable questions and answers and comments, but before wrapping up, are there any other observations, questions, comments, that you would like to draw the attention of?

>> PARTICIPANT: I was curious to know if you were a recipient of the SCC grant for deaf‑blind.

>> MIKE STARLING: No, we're not. I think they are made available only to individuals but they are working in consultation with the Perkins Braille Institute and Helen Keller National Center but I believe all of that money goes directly to individuals purchasing that equipment.

>> PARTICIPANT: Thank you.

>> SEONG-HO JEONG: Any other questions or comments?

Otherwise, I would like to wrap up today's sessions and I would also like to invite you to attend the demos which will take place outside of this room, on the same floor. The demos were prepared by the various organisations. Firstly, we have a demo from Japan, on development of a keyboard and a dictionary for sign language, which will be rented by Mr. Junto ohki of Japan ShuR and then we have another demo by NHK presented by Takayuki it toe. And then we have a demonstration from Italy, on speech management called mediamonitor which has been developed by an organisation in Italy called Cedat85, presented by Maria Palmerini.

And we have a demo from the witness TKT, which is a cool that measures the speech technology accuracy rate. This will be presented by Mr. Gion Linder and Juan Martinez.

And we have a demonstration from Universitat Autonoma de Barcelona which shows different approaches and the different qualities when we deal with media accessibility. This will be represented by Ms. Pilar Orero and Anna Matamala. And we have a final demonstration from the IRT, Institut fur Rundfunktechnik from Germany about HbbTV, which is integrated broadcast broadband system for access services. This is represented by Mr. Georg Huber.

Please join the interesting demos.

We will resume the workshop tomorrow morning at 8:30 sharp, with 9 session three, with the title of "Improving Accessibility of Equipment."

Once again, thank you very much for your participation. I will see you tomorrow. Thank you.

(Applause).

(end of session 5:23 p.m.)