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Visions of Interactive Television

A Pragmatic Approach

"Broadcast has to be changed from a system of distribution into a system of communication. Broadcast would surely be the perfect means of communication in the public sphere, [...] if it were able not only to receive, but also to send – which is to make listeners not only to hear, but also to speak, and insofar not to isolate them but to put them into relations."

Bertold Brecht, 1932 ¹

Introduction

Brecht's statement, quoted from his 1932 writings published today as the "radio theory" can be read as one of the earliest calls for enhanced, bi-directional communicative possibilities in broadcast media. But as the first German TV norm was defined only in 1929 – with 30 lines of resolution and a frame rate of 12 images per second – it is of course related to about one decade of experience with audio broadcast. Nevertheless it gives evidence, that already in the very beginnings of the broadcast era, there were people who criticised the only one directional flow of information of the new broadcast medium as a poor limitation and a lack of communicative symmetry.

It is not only the special situation of German media history, where – in the years following Brecht's statement – the development of broadcast media and television was closely related to the communicative demands of a totalitarian system and propaganda, that made electronic mass media suspicious for critical thinkers. It is also the dominance of economical

¹ In the German original: „Der Rundfunk ist aus einem Distributionsapparat in einen Kommunikationsapparat zu verwandeln. Der Rundfunk wäre denkbar der großartigste Kommunikationsapparat des öffentlichen Lebens, [...] wenn er es verstünde, nicht nur auszusenden, sondern auch zu empfangen, also den Zuhörer nicht nur hören, sondern auch sprechen zu machen und ihn nicht zu isolieren, sondern ihn in Beziehung zu setzen [...]“ Bertold Brecht, *Radiotheorie*, 1932

considerations in the whole system of TV programming and production which gives reason to seriously consider television as a mass medium which is ideologically driven. According to this, it is not surprising that many of the latest developments in broadcast technology, which turns towards new, interactive services appear under the promise of an advanced economical exploitability. Interactive Television, as far as it is developed by professional broadcasters and their technical suppliers at the moment, introduces smarter electronic shopping solutions, improved interactive product showcases or intelligent and responsive advertising services. So, on one hand new technical devices for interactive forms of television like MHP, the "Multimedia Home Platform", are developed to fit into the existing structures of the broadcast industry – including their advertising oriented financing. On the other hand the idealistic call from critical media theorists, to "turn mass communication into a communication of the masses" (Enzensberger) maybe has already been realised with the Internet as a non-hierarchical system of communication where every viewer could also become a sender.

A profound discussion of the potentials and possibilities for the development of an interactive form of television has to reflect problems on several different levels:

At first, interactive television is a technological problem, which introduces new parameters for the development of technical infrastructure. The main tracks for developments in this field can be seen in fast broadband computer networks, the newly introduced standard of DVB (Digital Video Broadcast), but also in wireless networks for portable receiving devices like WLAN or UMTS.

On the other hand, television is far more than only its technological infrastructure. Television today is at first an institution. The shift towards new, interactive concepts of television cannot ignore the present role and structure of television within the whole system for the production of meaning and discourse in a society. As an institution, also television has its own institutional logic, which tends to defend its own status inside of the public sphere. Possible problems deriving from this side could be for example, that the introduction of real "interactivity" would change the character of

television to such an extent, that an interactive television might not be television anymore – and thus the institution refuses to develop in this direction, even if this would be desirable for the public and the informational-culture of a society. Another possible scenario of this kind could be, that an interactive television, developed by the television-institution itself, finally isn't interactive anymore, even if it's said to be so – in the same way as most of the information produced and delivered by television at the moment in fact is no information.

And finally, as a third level to discuss the relation of interactivity and television, it has to be kept in mind, that also television films and even the worst TV-shows are all objects of human expression and insofar their form, their content and their aesthetic value can be analyzed, criticised, discussed – and even improved. Also Television is the materialisation of human spirit in concrete works, which are open to interpretation. So apart from technological or institutional considerations, the potential of an interactive television has to be explored on the basis of practical experiments and in prototypes, as the only way to give answers to the question what we are talking about if we discuss interactive television.

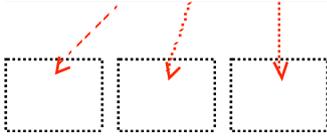
The following considerations are based on a lecture on my *Visions of Interactive Television* I was asked to deliver at the Media Department of FH Darmstadt (Germany) in 2004. Obviously this text will not provide definite answers, but tries to show up some general problems regarding interactivity and television, and finally will make some propositions for projects to be carried out to explore what a future interactive television could look like.



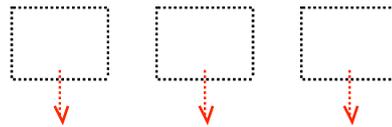
The 92 faces of Peter Greenaway:

Interactive -Video (CD-ROM)

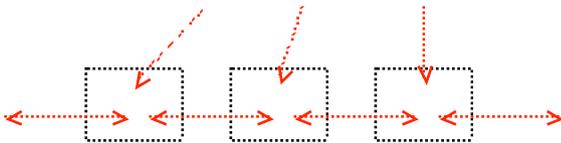
Level 1 – main Interface
Access to chapters and additional content



The 92 faces ...: Level 2 / Chapter 4
Selective access to video over keywords



The 92 faces ...: Level 3 / Topic:
"The future of cinema"
Navigation in the video over keywords



1. Video and interactivity: An example

Some years ago I had the opportunity to create the prototype of a product that maybe could be called an interactive documentary film.

It was a CD-ROM project about the British film director Peter Greenaway, that I could realise for the European Institute of Cinema in Karlsruhe (Germany), and which was based on documentary video footage of some lectures on filmmaking Peter Greenaway held in Karlsruhe in the year 2000.² As Peter Greenaway himself is one of the leading figures in exploring the impact of the new digital means of production on the cinema and the moving image culture, it seemed appropriate to use this material as the basis of an attempt to develop new, interactive forms of editing and distributing documentary video. One of the general problems to be explored with this experiment was the fundamental contradiction between the linear time flow of cinematic images and the nonlinear mode of access necessary for an interactive approach.

Entitled "The 92 Faces of Peter Greenaway" this project finally was published as an interactive interface application, provided on a CD-ROM disc together with the video material. The interactive approach here was created basically from a precise analysis of the content. In a first step a condensed version of Peter Greenaway's speech was created by extracting keywords from the video. Then these keywords were used as graphical elements, which were linked to the corresponding sections of the video. As these connections were made primarily with regards to the content, this Interface had more or less the character of a catalogue – which in general is nothing more than a collection of references, referring to any kind of source material, stored in an archive somewhere else. By introducing different systems of access to the video clips – one by keywords, another one by numeric order, a third one by colours – a play with different classification systems was added, which is some kind of reference to the essence of Peter Greenaway's art. Watching this composition, the user could now start to

² Published finally as „The 92 faces of Peter Greenaway“ at Bertz film book publisher Berlin (ISBN 3-929470-66-7), a similar publication followed later as „Margarethe von Trotta – Jahrestage“ (ISBN 3-929470-67-5), opening up an intended series of interactive-film publications about film directors.

approach the content in several different ways. At first, the links from the keywords simply appeared as triggers to activate the related parts of the video. But from a second, more distant point of view, the whole interface turns into a grid or a cluster of meaning, mirroring the filmic information on the disc, opening up new, nonlinear paths through the video content. The idea behind this was the attempt to create a kind of a "hyper-video" structure – in analogy to the idea of hypertext – as a network of references freely accessible by the user. Viewing video – which is essentially a linear medium, which preserves time in images – could now be combined with the experience of nonlinear browsing, creating unique paths through the film by jumping from one topic to the other – and sometimes even back to repeat some parts, so that every viewer creates his own version of this film.

As a model for interactivity in moving image media, this allows some general considerations about the relation of video and interactivity.³

Maybe the most important difference to conventional, linear video programs can be seen in the fact that viewing this kind of video becomes an individualised act, which seems to contradict the idea of conventional film and broadcast media, which tend to create an audience. More precisely, the reception of this kind of interactive composition, can better be compared with the traditional form of the reception of a book:

- The interactive program is designed primarily for an individual reception. (It is difficult to watch in a group.)
- The viewing unfolds in a personal, self-controlled and non-linear time-frame, like turning pages in a book (fast or slow, jumping pages, going backwards or possibly even starting at the end)

³ The notion of interaction or interactivity is a very broad and vastly discussed topic. Following a common idea, the computer itself can be regarded as a machine which is per se interactive. As this text deals primarily with a specific kind of media – which is moving image, or time based media, interactivity in this text is meant with regard to the timeline of film-media.

- Even the distribution is an individualised process (It is acquired in an individualised act of choice in a bookstore, or it is recommended and borrowed by friends)

Comparable conclusions can be made regarding the technical side of this project. As a CD-ROM project, it is realised with Macromedia Director authoring software – which is still one of the strongest authoring tools for such interactive prototypes today. About one hour of video material is compressed to occupy about 500 MB of disc space to fit onto a normal CD-ROM. So, within these technical parameters, it is obvious, that this project could also be produced and delivered in several other ways: As one alternative for example, it could be saved in Shockwave format or be turned into a Flash-Video composition for an internet distribution via a web site. Another possible example could be, to rework it complying to the DVD video standard and to provide it as a DVD video, or even to show it from a hard disk in a kiosk system in a shop or an exhibition context. So there are multiple paths such an interactive video product could go today – but in no way it would be possible to transmit it or to view it on television.

This calls for some general considerations regarding television and interactivity.



German "Tagesschau" from June 07 2004, 20:15, Television as an event

2. Television and Multimedia

The call for an interactive television is no longer very new. There have been many plans to introduce some kind of interactivity right into the existing television over the years. But due to a lack of appropriate infrastructure most of the efforts remained very limited.

The introduction of videotext or even the widely discussed switch to fibre-cable as a transmission standard for television in the 1980ies in Germany were said to be steps towards a future interactive television – which didn't lead to solutions or even prototypes of interactivity in television.

Then, since the 1990ies and the rise of computer and the internet this situation has rapidly changed, and the long proclaimed vision of an *interactive television* as the leading mass medium of the future – was overcome and replaced by the notion of multimedia. Multimedia now became the obsession of a decade and the interactivity once promised for broadcast media, suddenly appeared on a new platform outside of the television system.

In the broadcast world, this brought up the call for "convergence" – as a call from the television stations and not from the Internet community – which basically meant the idea of a merging of these two separate media. But for the first, the only surface where this became visible was the screen-design of most of the television stations, which began to adapt the look of multimedia – and today there are pop-up menus, hot spots and simulated links even in the one-directional broadcast medium.

Nevertheless, the discussion about convergence has exposed some crucial differences between television and multimedia:

Television – as we know it – is a one-to-many-program, in the classical sense of mass media. One and the same program is delivered to all viewers at the same time in a one directional transmission stream. This is the basis for the *event* quality of television, which tends to create a collective audience and

constitutes a specific kind of *public*, even if it is watched by most of the people alone in their flats.⁴

As traditional television is based on a one directional flow of information, in modern network terminology this would be called a "downstream only" connection. The internet or multimedia, in contrast, are based on bi-directional connections, which means that in addition to the transmission of information from the content provider to the "viewer" there has to be an additional flow of information back from the viewer to the content provider (downstream and upstream). Such a bi-directional connection can be seen as one of the basic criteria for interactivity, since only this kind of technological infrastructure enables the user to select what kind of content he wants to receive. This so called *backchannel* to the TV station or to the media server, can be regarded as one of the significant criteria to discuss interactive concepts. As we will see in the next chapter, there have been quite a great number of experiments with different backchannels in media history, producing an accordingly great number of different concepts and degrees of interactivity. In general, it can be said, that the relation between the two different channels of an interactive solution can be regarded as an indicator for communicative symmetry and the quality of the interactive concept. One of the visions of independent Internet culture had been the utopia to establish a network in which every user is to the same amount sender and receiver of information and thus a democratic communication situation is given from the non-hierarchical structure, emerging from this equality. On the other hand, it is obvious, that in practical use, people prefer to consume more media than they produce – and in a larger scale, societies tend to professionalize the production of information and entertainment.

⁴ Television programming strategically tries to support the viewer's perception of collectivity, which becomes most obvious in live broadcast like sports events, catastrophes or the moon landing. Here television can create an audience, which goes far beyond an idea of the *spectator*, who is watching an event in physical presence. Television supports the idea of the "public" as an abstract mass, which is defined by shared experiences and feelings, delivered and synchronised by the medium.

	Mode of Communication	Bandwidth Video Quality	Audience / Use
Internet PPP	Bi-directional Point to Point Protocol ("back channel"). Receiver can become sender.	3 mbit/s (DSL) (more possible) ⁵ Bad video quality	Individualised / many small groups "active" viewing, browsing
Broadcast Stream (DVB-C, DVB-S, DVB-T)	Linear distribution as one directional broad-cast from play out centre to the client	Up to 40 mbit/s for one channel Superior image quality	Mass audience: One program for all viewers ("one to many service") Passive viewing

Transmission systems: Differences between IP Networks and Broadcast⁶

3. Levels of Interactivity

Along the criteria of the "backchannel", it is possible to create a model for different concepts and levels of interactivity in television,⁷ even though it is a definition of qualities, this also brings up a historical dimension of development in I-TV.

A first, and most simple level of interactivity in television can be called the level of:

1. Basic Television – this is simply the possibility to switch on or to switch off, or maybe to change the channel.
Even on this level, there have been experiments with different sorts of interactivity, and one of the earliest and most curious examples of an interactive TV ever made, is a children's program realised in the US in the 50ies called "Winky Dink", where children were asked to draw pictures on the TV screen.

⁵ The discussion about bandwidth is a complicated and boring topic. 3 Mbit per second are at the moment offered by AOL and other DSL providers, the technology is designed to allow up to 8 Mbit/s. Other Internet solutions like power line technology (PLC) or wireless local loop are also on the market but no real alternatives at the moment.

⁶ Attempt to visualize some basic differences between television and internet-multimedia. In fact these categories are not very precise, as watching television has become an individualised act also and the image quality on the Internet is rapidly improving.



“Winky Dink” (1953)

Children's program from the US.

Viewers were asked to interact by painting on the TV screen, a Winky Dink drawing kit with transparent painting sheet and colours was sold in toy shops.

A second and only slightly advanced level of interactivity in television can be called:

- 2. Participatory Television:** this is interaction between viewers and the television program by means of an analogue back channel, usually by phone-calls over the telephone line. The TED “teledialog” from German TV history is a famous example, but also “call-in shows”, where viewers are calling directly to the studio, are situated on this level. One remarkable example of an indirect backchannel was used in a German TV show called “Wünsch dir Was” in the early 70ies, where viewers were asked to decide about the music to be played in the TV program by turning on all the lights in their flats and audience participation was reported then as remarkable peaks in power consumption measured by the local power stations.

A third, and more experimental level of interactive television can be described as:

- 3. Parallel TV:** This form of I-TV refers to multi-channel experiments – where one film plot is extended to be shown on different program channels from different points of view,

⁷ Ruhrmann, Nieland, Interactive Fernsehen, Wiesbaden 1997

so that it is possible to see a bank robbery for example through the eyes of the gangster on one channel and through the victim's eyes on the other channel.

There had been several experiments of this kind during the last years, but one of the earliest I know is a documentary show from Swiss television in 1986, where a theatre staging of "Schwanensee" was shown from the front side and from the backside of the stage on two channels at the same time.⁸

A special concept of interactive television on the level of parallel TV is an elaborated set-up referred to as "near video on demand" (NVOD). This is a procedure where the same program is started on a large number of channels but with a slight shift in time, so that you can see every show of a day's program without longer waiting time, whenever you drop in. As this system needs a vast number of free channels, it is used primarily in closed environments like in internal broadcasts in hotels, or by private cable network channels in the US.

A special quality of interactive services on TV that were introduced already many years ago can be seen in:

4. Additional Services like the German "Videotext".

Such additional services are not exactly an interactive dimension of the television program itself, but merely a certain form of supplementary information transmitted beside of the TV program, to be displayed by TV receivers on top or beside of the TV image. Examples can be seen in videotext like subtitles for the hearing impaired, or electronic program guides with program or additional

⁸ There had been a number of experiments with such multi channel dramas in several countries during the last few years. Well-known examples are „Mörderische Entscheidung" by Oliver Hirschbiegel (ARD / ZDF 1991), "D-Dag" a Program realised on 5 TV channels by the Danish Dogma group (1999/2000), or the cinema film Timecode (1999) by Mike Figgis. More information on this topic gives: Weiberg, Birk, Beyond interactive cinema, under www.keyframe.org/txt/interact/ (May 2004)

service information from the TV stations. The established systems of this type work without a backchannel for viewer's response but new concepts including a backline are in development. In any case it is a selective form of access to information and, as we will see, also the interactivity provided by MHP is primarily of this type.

With the discussion of the interactive concept of the additional services we have reached somehow the point of development where we are standing today with our broadcast system, and the following levels which describe levels of advanced interactivity in TV, exist already in prototypes but are not yet established.

A developed stage of an interactive bi-directional broadcast network is often referred to as:

- 5. Media on Demand services** – Media on Demand has for a long time been the ultimate goal of all developments in I-TV and is insofar a keyword of the debate. Basically this means the possibility to select your own program online, in the same way you would select a film in a video library. There have been many experiments and test markets towards this goal especially in the US trying out different modes of transmission. But as a system like this needs a highly developed technical infrastructure with a bi-directional connection and very fast transmission lines, none of these prototypes lead to a standard for a broad introduction.
With the introduction of faster internet connections like DSL, video on demand services are beginning to come up as internet solutions at the moment, like one example by the *Deutsche Telekom* shows, which is sold in a package with their broadband DSL connections.



Video on demand service by German T-Online, 2004

This example of a video on demand service is also a “pay per view” offer, a pay-mode often mentioned in combination with video on demand, which is a strong argument for its further development. For TV producers and content providers this would introduce a completely new billing system for television program, possibly even related to categories like quality or production costs of a program, creating competition and a real market situation within a TV-channel for the first time.⁹

As video on demand basically is a system for the distribution of traditional broadcast content, there is still one more step to go towards a real interactive television, which can be called:

6. Communicative TV. This level is somehow difficult to understand, especially in comparison to the level of *video on demand*. From the technical point of view, this most advanced level of interactive television has to be based on

⁹ Nevertheless it is questionable whether the segment discussed under the notion of „lower class television“ at the moment and which is consisting mainly of game shows, talk shows, casting shows, advertising and sport, will disappear from the screen under real market conditions.

bi-directional connections between viewers and content providers, which are designed to enable instant access to full screen video, so that it would be possible to navigate within the interactive film or program offers without longer waiting time. But additional to the technical basis of a developed bi-directional network, this level of a communicative TV would have to rely on a culture of developed interactive content. So different from the level of video on demand, where you can order and watch a conventional television film *on demand* through a network, here the television content itself has to be changed and adapted to suit the new interactive culture. In other words: for this most developed level of an interactive television a completely new sort of films has to be produced.

This could be for instance:

- a feature film, which has several different endings or cue points where the viewer can intervene and change its direction or dramaturgy
- a news program of developed hyper-video content, where it is possible to switch from one topic to another and browse through the news of a day in form of short clips referring to each other, (like we are used to do with text information in the internet today)
- an advanced, video based culture of service, of e-commerce or of trading. (Where – just as an example – a user manual of a product is not a written text anymore but it is shown step by step as a hyper-video manual)

The development of an interactive culture on this level has to be regarded as already on its way. Prototypes of non-linear fiction films for an interactive approach are shown in location based entertainment, courses in non-linear storytelling are already taught at many film and media schools all around the world and every year the experimental film and the media art scene is contributing a large number of works which explore new modes of an interactive approach to moving image media, which are of

shown in art exhibitions, film festivals or published independently.¹⁰

Nevertheless, the liveliest terrain for experiments in interactive culture can be seen in the Internet. Important steps towards a film-like impression of internet content are made especially with the spread of synchronised media, of which the most well known is that of the *flash* type. The recent integration of digital video into this most popular authoring tool for synchronised media is undoubtedly an indicator for the direction of future developments. (an example exploring this technology can be seen at: Vöhringer/Weiberg – Interview with Lev Manovich at www.keyframe.org/int/manovich).

4. Seeing far

Considering the great number and the broad variety of experiments already made to merge television and interactivity, the question arises how a notion of an interactive television can be established, which is not too open to still be useful. This attempt cannot avoid questioning the idea of television itself.

As the common idea of television still refers to the classical model of TV as a centralised institution for the production and distribution of information by a privileged national television station as it was the case in the era of the European public broadcast system, this model will surely be overcome with the further spread of interactive broadcast solutions. In fact, the idea of such a national monopoly of information has already been challenged with the spread of private broadcast channels, and the introduction of the remote control since the 1980ies and in the 1990ies in Europe. A new, in some ways interactive mode of watching television emerged only from the increasing number of available television channels. Additionally, the remote control turned out to be an unexpectedly strong device shaping a new mode of reception on the viewer's side, which finally had an effect on the program production by the TV

¹⁰ An example for a location based cinema experiment is for example the FUTUROSCOPE - cinema of the future theme-park near in France, for experimental works see for example exhibition catalogue: *Future Cinema*, ZKM Karlsruhe 2001

companies. With the remote control button as an ultimate voting instrument of the TV audience, paired with the obsession for quota and market share as the only criteria of success for program producers, this indirect form of interactive television lead to a TV culture even below the lowest common denominator. With the current introduction of the new digital transmission standard for television DVB (Digital Video Broadcast) and a further increase of the number of available TV channels, this situation could maybe change with the presence of more special interest channels specialising only on some clearly defined topics – like art or sports – for only a small part of the audience. But this model is already from behind the idea of television as the integrative, collective medium, which is embracing and constituting the whole public sphere. The often claimed live- or event-quality of television as a unique characteristic of this medium which no other medium could deliver, becomes more and more questionable under these new conditions. At first, a bi-directional, interactive connection not necessarily contradicts to the transmission of a video live stream, for example over the internet or to a cell-phone – so also other technical devices than the traditional TV set in the living room could adapt this special quality. And second, most of the current so-called live-shows on television in fact are not live, but only pretend to be. Artificial laughter, an audience in the studio and a straight forward presentation are used only to make people believe they are participating at an spontaneously emerging event, in a present social situation, but in fact, most of the game-, quiz-, or entertainment shows in television today are pre-produced and slightly edited. In this sense TV only serves to a certain desire of the public to be part of a larger public, which in fact they aren't. From this perspective, the rise of television has to be seen in connection with an existential and factual isolation of people in the modern world and the media as responding to a common desire be relieved from loneliness. This is a very serious issue but as media are in the same way responding to, as they are shaping the forms of human behaviour, the TV institution's responsibility for this situation of common isolation should not be underestimated. A different kind of media, according to this thought, might have resulted in a different kind of society.

Regarding the present structure of the broadcast system in most of the European countries, it arises the question how far

the idea of television itself is – and should be – bound exclusively to institutionalised and professionalised TV stations at all (especially as many TV channels do not produce their own program anymore but only buy it from subcontractors). If it seems legitimate to regard every kind of distribution of moving images to an abstract public via a transmission network as a form of television, then the existing Internet infrastructure already is a kind of television, and as it is interactive, it therefore is interactive television. And in fact there already are quite a great number of projects all around the world calling themselves internet-television.

Television in its etymology as tele-vision basically means nothing more than getting an image of something that's far away (or *seeing far*). Regarding the development of television in the sense of the considerations made before, and with a full awareness of the important role television plays within contemporary societies today, I would suggest, to establish a new, extended notion of television which integrates every possible technological device that enables the transmission of moving images or audiovisual media to a spread and large public over a far distance. Beside the plurality of positions today there also seems to appear a plurality of technologies of television, and especially some of the new technologies seem to have an ability to develop a new image of the viewer in TV, which is not only that of a passive consumer.

So this open definition of television seems to be necessary not because the discussion about television as a mind producing institution seems to become obsolete – it is more important than ever. Furthermore this open perspective seems to be inevitable because the 20th century idea of the television as *the* national monopoly of information has come to an end – and this end will hopefully be interactive.

5. Visions of I-TV

In the following I want to introduce a more practical perspective on interactive television and start to discuss technologies and projects of I-TV on the level of their practical value for media workers. All these examples refer to technology, which already exists, or which is about to be introduced at the moment.

Nevertheless, all of these projects approach the problem of interactive television from a different side.

The first, and maybe most boring example refers to the idea of interactive television as it will be introduced by television stations in the near future. I will simply explain the basics of this new technical standard.

The second example is based on telecommunication networks as they are developed for mobile telephones and which were extended also for transmission of multimedia content during the last few years.

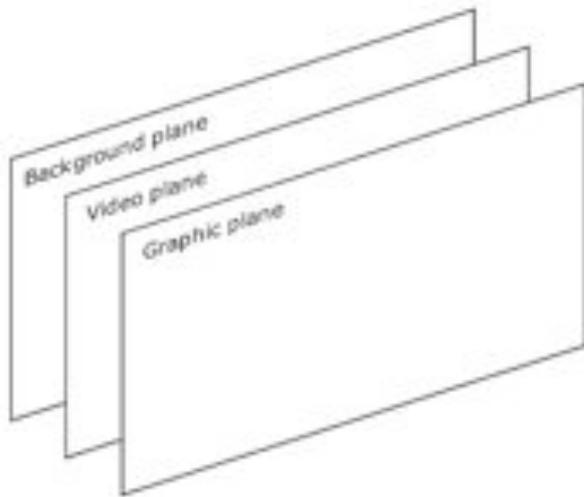
The third, and maybe most creative example is based on technology which – like the remote controller – could be introduced on the side of the TV consumer and which could shape the consumers behaviour in a way which would have a tremendous impact on the program production by TV stations. I believe, that these three examples – together with the Internet – outline the terrain for a future interactive television.

Vision 1: MHP – a promise of interaction

The major innovation in the field of interactive television services which has been developed in a collective effort between television stations, TV producers and hardware manufacturers in the recent years emerges with the standard of MHP. MHP, the so called Multimedia Home Platform is introduced into the television market along the idea of "Multimedia-to-TV-convergence" in a great number of countries all around the world and especially in Europe. MHP content is already provided beside of the broadcast program by nearly all German TV Stations at the moment, even though only very few spectators are able to receive this offer with their TV receivers. But as MHP decoders will be implemented widely into most of the new receiving devices for the new Digital Video Broadcast standard (DVB), it will surely come into the focus of broadcasters and content producers – especially as it is a standard, suitable also for commercial use like advertising, banner presentation or e-shopping solutions.

In short, MHP can be regarded as a kind of hardware supported browser, designed to display JAVA based multimedia content as an overlay – over the MPEG 2 video layer of a DVB broadcast

stream. In so far MHP is not exactly a standard of interactive video, as it does not affect the video track, but merely the display of additional content beside the TV program.

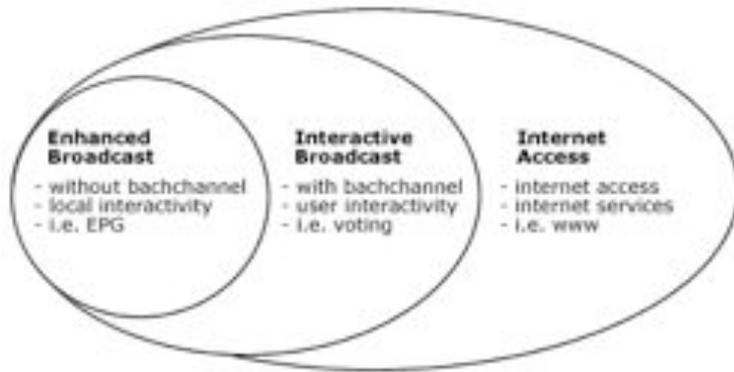


Video planes in MHP¹¹

As three possible modes of interactivity in MHP there were defined the level of "Enhanced Broadcast", "Interactive Broadcast" and the most advanced level of "Internet Access".

The basic concept of MHP as an "enhanced broadcast" without a backchannel offers the possibility to navigate in a limited number of pages, transmitted from the broadcast station to the viewer together with the video signal. Interactivity here is the option to select pages from "digitext" or "Electronic Program Guide" (EPG) offers as a kind of enhanced videotext system with graphic functions.

¹¹ Illustration: Video Planes for content display, as they are used by the MHP standard, taken from: Worthington, Tom, Internet TV Convergence with the Multimedia Home Platform, (Oct 2001): <http://www.tomw.net.au/2001/itv.html#L6898>



Levels of interactivity as they are implemented to develop in MHP¹²

On more developed levels, MHP is designed to open up to basic levels of interactive communication equipped with a backchannel to the TV networks. But as television broadcast is a “one to many” program, this communication back to the broadcast stations will never lead to an individualised response (like a Media on Demand service could give).



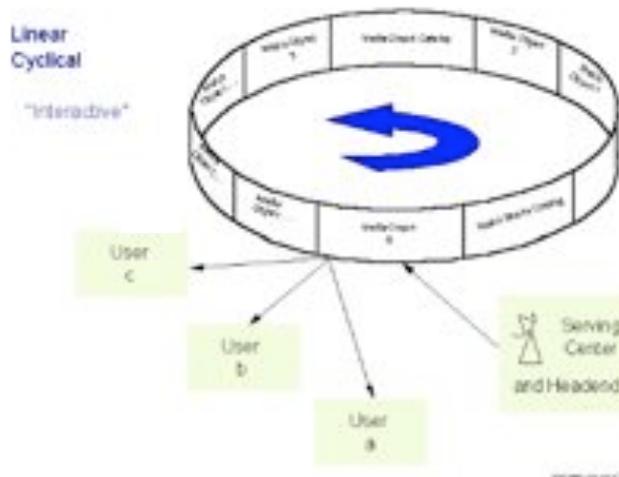
SMS via TV screen (left), **Chat** environment from Sky plus (Open TV – right)

Then in its most developed stage, MHP is conceived to allow a connection to the Internet as well, and to provide some basic functions of multimedia computers. A Spanish prototype for example demonstrates the possibility to write and send SMS via TV screen, with the remote control, or some samples from British *Open TV*, show an environment where it is possible to chat with other viewers of a program in a virtual space beside the TV program. Regarding interactivity arising from the

¹² Koch, Christian, Multimedia Home Platform, Oct. 2001:
<http://www.uni-weimar.de/~koch17/rbs/>

television program itself, the most of the examples to demonstrate the interactive potential of MHP-TV are shows, which include some kind of voting procedure as a feedback from the audience to the TV station, like they are necessary for "interactive" programs like *Big Brother*, or *The European Song Contest*. But regarding these examples it is important to keep in mind that this level of viewers response in MHP is not a bidirectional communication via the digital broadcast stream, comparable to the bidirectional point to point protocol of internet connections. Even the digital transmission of broadcast content in the DVB standard is – and will always remain – only a one directional datacast. Bi-directional interactivity in MHP – like supporting the favourite song in a song contest – is based on a connection of the MHP box to the viewers telephone line, where it dials up and places the vote. Neither will any kind of voting- or selecting-action of a viewer ever lead to a kind of individualised response on a *video on demand* level. So from this perspective, the level of interactivity in MHP is still comparable to the old teledialog (TED) concept combined with a modem connection from the PC. Display of Internet content on the TV screen via MHP is based on the same principle and needs data programmed especially for MHP, as a PAL screen is not suitable to display ordinary HTML Internet content. (This will cause the same problems as WAP, which has never been a success).¹³

¹³ Information and critical remarks about MHP are following the critical revision of the standard by Tom Worthington, mentioned above but are also based on interviews I made with experts from ZDF Vision and Fraunhofer Institute Bonn as developers in MHP



"Disk in the Sky" – carousel mode of interactive access¹⁴

This brings up a general problem of data transfer in MHP as a datacast. The transmission of data in DVB is organised along a certain mode called the "data carousel". As MHP is provided as a downstream only signal together with the broadcast stream of a TV network, it is necessary to cast all content sites a viewer could possibly visit at any time – because without a back channel, it is unpredictable which site will be selected for display by the consumer.¹⁵ – So all the content of an MHP service has to be streamed permanently, again and again, one after the other in a circle – like in a carousel. This causes slow handling and unpredictable loading time.



¹⁴ Illustration from <http://www.ianr.unl.edu/EDUPORT/R-ISCC97.HTM> (06.2004)

¹⁵ Even with a backchannel over a TV broadcast connection MHP will never be possible to give an individualised response. This is the essential difference between Internet point to point protocols – as individualised bidirectional connections and broadcast as a "one to many" offer.

Shenzhen Cable TV, one of China's largest cable operators, is launching the world's first commercial cable broadcast of digital interactive television services for DVB-MHP.¹⁶

So as it is a hybrid medium, born out of convergence strategies, MHP surely could not be regarded as a "killer application" which has the power to rule out all the other rivalling forms of multimedia – especially with people who already use computer based multimedia and the Internet. But nevertheless MHP is designed as an open standard, which is about to develop with its use – and as it will open up, and support features like display of dynamic content from the Internet, I think the possibilities of this new standard should be explored.



"Sublime I-TV suite" – **MHP authoring software**

On the software and hardware market, there already are authoring tools for MHP available, provided together with emulating systems or play-out devices, so it is possible to start with the production of MHP multimedia even outside the TV stations already today. But as the distribution of MHP content is

¹⁶ Screenshots by ALTICAST – as one of the major developers of MHP Technology – www.alticast.com

only possible in connection with television program and its broadcast signal, the possibilities for the creation and distribution of this kind of multimedia content are nearly as limited as the possibilities to create and distribute TV program itself.¹⁷ Considering this, MHP can be regarded as a multimedia standard, which is clearly limited to the professional world of television as an institution – and insofar is essentially different from the interactivity offered by computer based multimedia like the Internet. Nevertheless an impressive amount of MHP media is already produced and distributed day by day by almost all broadcast channels in Germany – insofar this new kind of multimedia is not only a vision but also a fact.

Vision 2: Call Yesterday

A second project I want to propose here as a vision of a possible interactive television is a concrete, content oriented multimedia project designed for mobile devices like modern mobile multimedia telephones or small handheld computers for example of the PDA type (personal digital assistants). This project, which was developed already some years ago as a project offer to a cell-phone-company is the attempt to use the new portable communication devices to create a universal interactive multimedia information system, which finally could become even somehow encyclopaedic.

Initially it was intended to create something like a gate to the past, because everywhere we go in the public space especially in Europe, we are confronted with historical dimensions of culture, which most people can hardly know or not even perceive. Nearly all of the street names in the European cities for example are referring to events or people from history – and nearly each street again has its own touristic spots and birth-houses of writers or generals or other places with happy or tragic references to layers over layers of history.

As a first step towards a practical realisation of this project, it was thought to establish an interactive access system for

¹⁷ Not every viewer can also become a sender like in the internet

mobile telephones in selected areas of a chosen city by simply adding telephone numbers to the plaques, which are usually indicating places of cultural-historical value inside of the urban space. Dialling these telephone numbers should now lead to more detailed information about these specific sights – as if consulting an interactive tourist guide which is accessible over the mobile phone. On a first level, this project could work even as an audio only version, by using simple telephone answering machines to provide short spoken text information about the selected sights. But then later on a more developed stage of this system and with increasing multimedia capabilities of mobile phones, the content should become more elaborated up to the level of documentary film and rich multimedia content.



Project phase 1: Apply numbers to places with historical meaning!

The vision behind this project – and this would be one of my visions of a possible interactive television – was to turn the viewers perception of a city into that of a large museum of historical cultural goods, and to turn the cellular phone into something like an interactive audiovisual encyclopaedia, comparable to an enhanced multimedia-audio guide of an art exhibition – or even a more advanced feature – that gives access to the hidden dimensions of the cultural past of the real, tangible environment the viewer is physically confronted with. The communication device of the cell phone could so turn into a universal intelligent library comparable to all the utopian answer-everything machines we've seen in so many science

fiction movies yet. Based on a tool, nearly everybody possesses in our society today, this project could create a completely new relation between the media- and the real world's space and would increase our ability to make questions answerable and spaces readable beyond the surface of the pure visible.



Project phase 2: Create films and applications on historical topics!

From the technical side, the content for such devices could be produced and provided with the common tools of digital multimedia production today. Upload to mobile phones, portable computers or PDA's could be established via network connection (telephone, internet, WLAN) or be provided on hardware storage like SD cards, USB-Memorysticks or on CD-ROM medium.



Project phase 3: Distribution of content with existing technologies like QuickTime¹⁸

Recalling my initial example of the interactive CD-ROM about Peter Greenaway, in this project there were provided nearly 60 minutes of video material with half of PAL resolution using less than 500 MB of disc space to fit on a conventional compact disc. So with a common 512MB SD-chip, as a storage which can be inserted directly into many mobile telephone or PDA devices, it should be possible to provide quite a large amount of video – especially if it is adapted to the low resolution of mobile devices.¹⁹

First steps to realise such a project of interactive television, had to be made of course, by creating a small-scale model in a test environment. An introduction on a large scale probably is not possible without close relation to a telephone company. But of

¹⁸ Picture by Apple/QuickTime, 2004 (product promotion for cross platform authoring with apple QuickTime, Apple 2004)

¹⁹ As the main part of this text was conceived and written already in spring 2004, technology has developed since then and now there are more and more products available, which can be used for a system of this kind. Cell phones are offered with direct connection to the internet, devices like i-pod video, new video capable playstation / gameboy devices or GPS linked handheld navigators open up new solutions and possible combinations of services.

course many other commercial partners could be imagined like for example touristic organisations, marketing institutions of cities or cultural sites, even museums or archaeological parks – or merchandising partners selling touristic street maps with an index of the most important access numbers to the film-database.

The maybe most fascinating vision here would be, to create an open audiovisual knowledge base about the world, which could grow from contributions of all possible users, as a kind of television system of the Wikipedia type.

Vision 3: Digital Video Recorder

The third and last vision of a possible Interactive Television, I want to present here is a project dealing directly with the new Digital Video Broadcast standard (DVB). But different from MHP, this approach to Interactive Television is based on technological devices, which can be introduced only on the consumers' side – without support from content providers. As a technical basis, this project would focus on the new emerging type of hard-disc based digital video recorders (DVR) as playback devices for multimedia applications. With only slight modifications of these digital recording systems it should be possible to create a kind of an interactive video jukebox, which controls recording, playback and navigation within the broadcast program of all receivable TV stations. Unlike most of the other concepts of I-TV, this approach has the potential to create a high level of interactivity with a real navigation within the video content of a conventional TV program – even up to the level of *hyper video* structures.

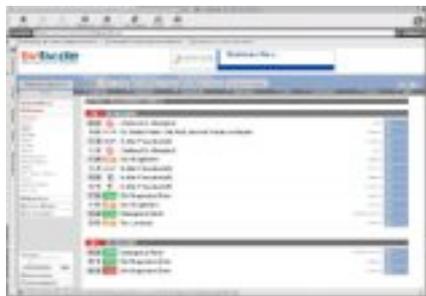
As shown initially with my CD-ROM example, interactivity in digital video can be created along the principle of non-linear access, which is comparable to the elementary principles every non-linear editing system (like AVID or Final Cut Pro) is based on, too: Non-linear access usually emerges as a relation of a very small file of control data, to a huge amount of video data stored on a mass storage as a media-database.

Now, if it would be possible, to develop an autonomous technical standard, by the means of which a digital TV program, which was recorded on the local hard-disc of a computer or a digital video recorder (DVR) as a media database, could be controlled and selectively accessed by a small interface application provided beside the broadcast stream or over the Internet, this could open up a totally new dimension in television broadcast. Unlike most of the other offers appearing under the label of interactive television today, this approach could offer direct control over the video-stream of broadcast content.

Future solutions: hardware-software alliances and PC-TV hybrids:

Elegato Systems "Eye TV 400"

Records Digital Video Broadcast (DVB-T) as a native MPEG2 stream to the hard-disc via Fire Wire. Enclosed software provides basic editing functions, automatic programming of the VCR via electronic program service from the Internet (www.tvtv.de), backup directly to DVD.²⁰



www.tvtv.de

Electronic program guide from the Internet with interface function to communicate directly with a DVR device like Elgato Eye TV, FAST Videoserver or Siemens Activy for automatic programming etc. (for more developed products of this kind, see www.TIVO.com from the US).

²⁰ On Elgato systems see: Andreas Beier, Eingeschaltet – Zwei Empfänger für Digitalfernsehen – Digitales Fernsehen unter Mac OS X, c't 6/04, Seite 96.

Siemens Activy

Hybrid system of a DVB receiver with integrated hard disc recorder, DVD burner prepared for DSL connection for internet access, plays also Windows Media, DivX etc., Offered in an alliance with t-online vision video on demand service and access to internet EPG services for automatic programming of the DVR



In the media world, there already are some applications and products making steps into this direction, like for example a simple XML based computer-language called SMIL (Synchronised Multimedia Integration Language) which has the ability to control and selectively access video data stored on a computer. As I tried to show initially, it is possible today in a media lab situation with a multimedia-computer, to create model-applications of interactive or re-edited versions of disc stored video content, which can be navigated via a graphic interface. With common DVD editors like DVD Studio Pro it is possible to realise such interactive editions of video material even by using a native MPEG-2 encoded video content as it is provided by DVB without the necessity to recompress the video data.

The vision regarding an interactive television based on these technologies would be, to introduce a standardised product or a service offer that provides interactive graphical interfaces for navigation together with automatic recording of broadcast program onto DVR devices for a network of users. This could be offered as a service product which is open for all users over a defined interface – like for example the *ShowView* code which was provided in printed program magazines for easier programming of VHS video recorders – or as a product package sold together with a DVR hardware component like for example TIVO (www.tivo.com) does in America. Especially TIVO where selective recording from the program offers of almost all of the American broadcast stations is organised by an Internet service in connection with a DVR hardware product, can be regarded as a pioneering product showing the potential of developments in this direction. On the German market there are some comparable products just emerging as hardware-software

alliances between Internet based electronic program guides (like www.tvtv.de), which can be linked directly to DVR hardware devices made by manufacturers like Elgato Systems (Elgato *Eye-TV*), or Siemens (Siemens *Activy*), offering service on the level of internet controlled video recording. As a vision about interactive television of course, a future product of this kind had to go far beyond simple recording and playback, but should offer also content management of the recorded broadcast material over interactive graphical interfaces. One possible example of an advanced interactive solution on this level could be a TV-news-program which is streamed to the hard disc of a users DVR as a datacast let's say already at a quarter to eight, so that at eight, when the viewer drops in to watch the news, he already has all news-content on his disc and a graphic interface on screen, where he can navigate through a menu and selectively watch only those reports which are of interest to him. Another possible system could stream only those news clips of preselected fields of interest (like sport, art, fashion or whatever) to the disc continuously, preserve those marked unwatched, automatically update outdated events, search for video clips by user defined criteria and so on ...

As shown before, the technical tools to create such elaborated models of interactive television services based on hard disc video recording are available already today and with the switch to digital signal transmission for TV (DVB) a television program provided as a datacast (broadcasted as a data stream only) could possibly even be streamed faster than the time-base of the streamed program itself, so that a 20minutes program could be transmitted maybe in 10 minutes for storage on the consumers side. In a later stage interactive playback applications with graphic interfaces for user interaction could possibly even be implemented as an MHP applet, for use with a future generation of MHP compliant DVR devices. On this level, after selective reception and interactive re-editions of daily broadcast content have become widely accepted, this concept of a non-linear access to TV program could also be anticipated in the content production and programming of TV-stations. Then interactive access to their own program could be offered as an additional service even by the TV stations themselves.

Epilogue: the Television, the Media and the Interaction

With the pragmatic considerations introduced now, the discussion about interactive television turned very technical. But as it was emphasised more and more insistent by philosophers and media theorists in the recent years, not only artistic expression should be object of intellectual criticism. Also the technological emanations of human culture have to be in the focus of a discourse comparable to that around art. As products of human thought and activity also technology has an ideological dimension. Being a materialization of an intellectual concept each tool or technical feature also draws a picture of a human condition – a “Menschenbild” so to say.²¹ From this point of view, the creation and production of technological devices can be interpreted as an act of inscription of a set of preoccupations about human being and of knowledge about an objects possible use. In this sense, the creation of technology always is a statement about what a human being is – or should be. A weapon, as a technological device for example is based on an image of the human as a being with the ability and at least with a concept about it’s willing to kill. The construction of a television set – according to this perspective – is the inscription of an image of the human race as a species which is willing and entertained and delighted to watch for example the *Tageschau* News, the cases of the TV detective *Derrick* and other interesting formats like the BBC documentations on natural history. Interpretations following this kind of archaeological approach to contemporary culture – as they became fashionable and inflationary with the rise of the discipline of cultural studies in the recent years, have always to be read with caution. Because in most cases, human practice is much more creative than the fantasy of scientists who are interpreting phenomena. A TV set for example is not necessarily used to watch crime-series but could also function as a table or as a lightning source for reading or only to create a colourful and romantic ambience. Often there is a difference between the intention of engineering thought, and the use made of engineered objects later – and especially misuse or adaptation can turn out to be very creative.

²¹ Sic! – German in my original.

As interesting as these considerations might be, it is time to bring them back to the topic of I-TV. At least for me – and maybe also for a critical perspective in media theory rooting in considerations and historical events already alluded to by initially mentioning the position of Bertold Brecht – an evaluation of the present concepts in the field of interactive television is inseparable from their ideological subtext.

Regarding the three practical examples introduced here before, the field of interactive television seems to be encircled in a triangle. A triangle insofar, as each suggestion can be assigned to one of the essential categories of the communicative process – which basically are: the sender, the message (i.e. medium) and the receiver.

As it was already pointed out, the official standard in ITV, the concept of MHP, clearly is a technology of the media industry, emphasizing the interests, the needs and the specific kind of technical creativity of an economical field dealing with the production – and branding – of information. As a technology and as a materialization of a specific idea (i.e. ideology) of broadcast communication, it deals with a simple and very poor concept of the viewer, who is treated as a passive category with a predefined and limited set of interests and options. As it still monopolizes the creation and distribution of information into the hands of the established broadcast channels it can be regarded as a perpetuation of the established structures of the cultural industry.

In contrast, the encyclopaedic approach designed for mobile video devices as a second vision of I-TV, is thought up with an emphasis on the content and on the communicative situation. According to the communicative model, this project accentuates a certain sophistication of the message and the medium. It is a project conceived from the perspective of a practical media maker, who is looking for new boundaries in moving image communication. As the content, the media and the communicative situation are inseparable interwoven, this project marks a very special approach to the field of I-TV, creating a completely new relation between documentary film, the spectators mind and the physical space he's moving in. In terms of Interactive television this project would really explore a new field and expand the notion of I-TV.

Finally the third project, based on hard disc recording of video material, is a concept of the recipient – i.e. the viewer. This approach mirrors the perspective of the viewer confronted with the vast amount of broadcast content emitted by the broadcast stations all around the world day by day, which are all rivalling for his attention. This viewer, who in most cases is only treated as an abstract category in broadcast communication, here becomes a real person taking up the challenge of plurality of information. It is a technology designed to prevent viewers from drowning in the overload of information – with the ability to create new modes of navigating (or surfing) the TV programs and maybe to introduce a new, reflected mode of media-use and of watching.

Comparing the three discussed approaches to the field of interactive television, I personally would regard the second vision of a mobile TV as maybe the most coherent proposal – and I am convinced that it is only a question of time until systems like this will be realised in a larger scale.

The most influential system however can surely be seen in the developments going on in the field of digital video recording. Seen from an abstract point of view, even free multimedia projects like the CD-ROM about Peter Greenaway which was discussed initially to introduce some fundamental questions of interactivity in time based media is not essentially different from this technology. Basically this CD-ROM also is a media database stored on a mass storage which can be selectively accessed over a graphic interface and a small control application.

Regarding the future of television – as a technology as well as an institution and a form of cultural expression – the impact of DVR devices cannot be underestimated. Already the timeshift option of the existing DVR machines, which allow to watch TV programs without the advertising breaks, has led to a state of confusion in some parts of the broadcast institutions. Even without a connection to advanced interactive navigation services, these devices invent a new power of the consumer – and create a competitive market situation in the broadcast arena, where competition now emerges not only between the

different channels, but also between the program offers of one and the same station in a timeslot of several days.²² But competition – according to neoliberal thought – is said to be the mother of the market, which often is acclaimed as the father of democracy. Facing this challenge, we can hope that this new situation will lead to a reinvention of a discussion about quality in broadcast production. – And finally, it will turn out, that it is exactly this discussion, which is the most interactive dimension of mass communication at all.

Dirk Schulz
08/2005

²² Because different from traditional tape recorders harddisc based access and playback to video content became so easy, the social practice of storing TV program seems to change. Video recording is not anymore a practice related primarily to “stock” content – like blockbuster Hollywood films – but more and more also to “flow” content, with only temporary value, like for example the news, or a TV series. Following this, the new competitive situation in TV programming has to be seen as a time slot of a few days, where possibly all programs ever broadcasted stand in direct competition even in this segment of their programs.